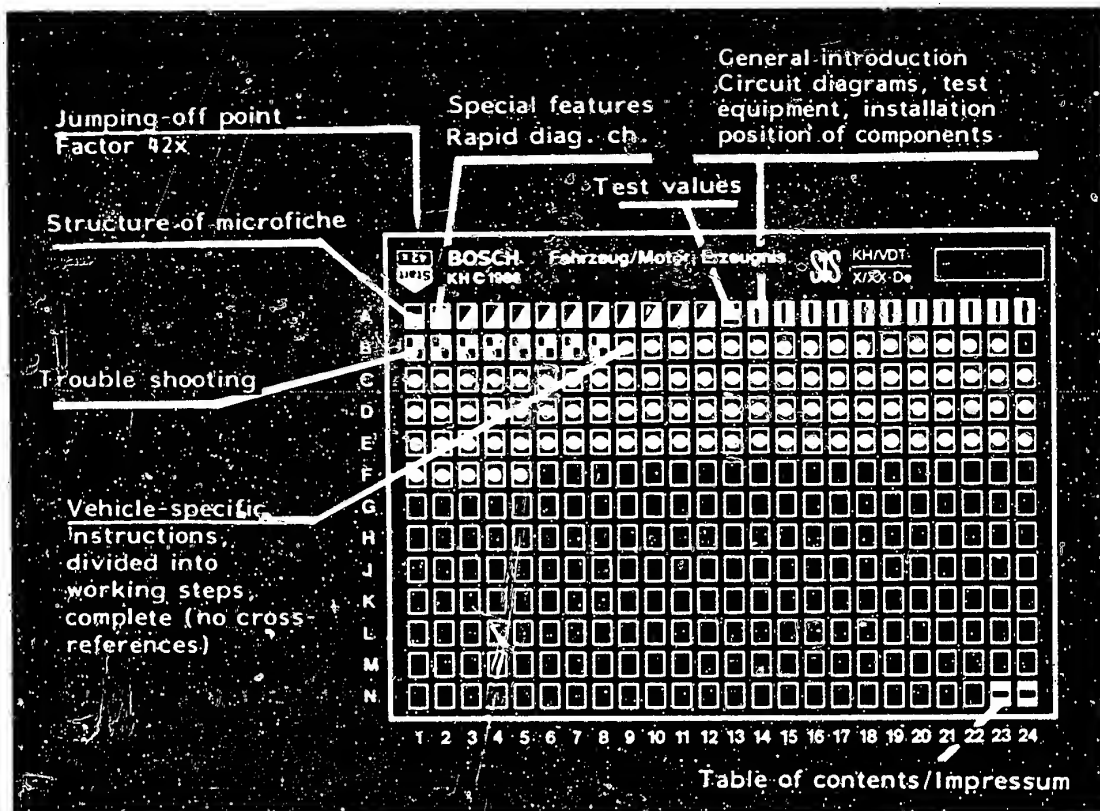


## Structure of microfiche

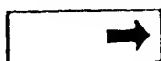


1. Read from left to right
2. Title of microfiche (appears on each coordinate)

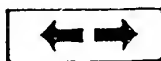
<b>E16</b>	Product/component/test step
	Vehicle/engine

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

**C6**

**A1**

Trouble-shooting program



## 1. Special features

Microcard for digital, electronic transmission control in the BMW models of series 6 and 7 Automatic (as of 9.83) and 745i (3.4l Turbo) as of 5.83.

- The control unit forms one functional unit with the Motronic and uses a microprocessor as well as the engine sensors for both systems jointly.
- Separate microcards have been prepared for the Motronic and the knock control (745i only).
- Sweden/Switzerland version (635CSi, 735i and 745i; as of 9.84) as well as Japan version (745i; as of 10.84) are included.
- This microcard replaces BMW 00/E 121.

## 2. Rapid Diagnosis chart for universal test adapter

The following rapid diagnosis chart makes it possible for the expert to quickly check the electrical part of the system using the universal test adapter.










The rapid diagnosis chart contains the following information:

- Switch positions on universal test adapter
- Sequence of test steps
- Notes on how to operate the universal test adapter or other components.
- Readings on multimeter and motortester
- References to coordinates of the respective detailed testing and trouble-shooting program.

If detailed information and instructions are required, always proceed according to the trouble-shooting program starting on Coordinate B 1.

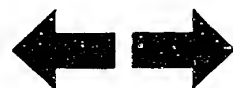


# Rapid diagnosis chart for universal test adapter

Test step	Switch position		Remarks	Test specifications (reading)	For trouble-shooting see Coordinate
	V	$\Omega$			
1		1	Selector switch in position "P". Ignition off. Disconnect control unit. Measure insulation resistance of speed sensor shielding. Term. 23 to Term. 22 (ground).	greater than 100 k $\Omega$	B 16
2		2	Measure insulation resistance of speed sensor. Term. 8 to Term. 22	greater than 100 k $\Omega$	B 18
3		3	Measure insulation resistance between shielding and speed sensor lead. Term. 23 to Term. 27.	greater than 100 k $\Omega$	B 20
4		4	Measure winding resistance of speed sensor. Term. 8 to Term. 27.	0.7 ... 1.8 k $\Omega$	B 22
5		5	Measure shunt resistance of kick-down switch. Term. 3 to Term. 22. Do not operate accelerator.	greater than 100 k $\Omega$	C 1
6		11	Measure insulation resistance of solenoid-operated valves and of pressure regulator in transmission. Term. 18 to Term. 22.	greater than 100 k $\Omega$	C 3
7		12	Program switch of vehicle in position "S". Measure insulation resistance of program switch. Term. 4 to Term. 22.	greater than 100 k $\Omega$	C 5
8		13	General: Lead from Term. 35 to Term. 22 (ground) With 745i: Internal resistance of knock control unit.	General: less than 10 $\Omega$ 745i: 1 ... 9 k $\Omega$	C 7
9		14	Program switch in position "E". Measure resistance. Term. 4 to Term. 22.	less than 10 $\Omega$	C 9

**A3**

Rapid diagnosis chart  
Electronic transmission control BMW









**A4**

Rapid diagnosis chart  
Electronic transmission control BMW



# Rapid diagnosis chart for universal test adapter (continued)

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	<u>Test specification (reading)</u>	<u>For trouble-shooting see Coordinate</u>
	V	$\Omega$			
10		15	Depress accelerator as far as it will go. Measure resistance of kick-down switch. Term. 3 to Term. 22.	<u>Less than 10 <math>\Omega</math></u>	C 11
11		16	Measure winding resistance of solenoid-operated valve MV 1. Term. 5 to Term. 18	<u>25 ... 65 <math>\Omega</math></u>	C 13
12		17	Measure winding resistance of solenoid-operated valve MV 2. Term. 6 to Term. 18.	<u>25 ... 65 <math>\Omega</math></u>	C 15
13		18	Measure winding resistance of solenoid-operated valve for reverse gear lock. Term. 7 to Term. 18.	<u>25 ... 65 <math>\Omega</math></u>	C 17
14		19	Measure winding resistance of solenoid-operated valve for converter clutch. Term. 17 to Term. 18.	<u>25 ... 65 <math>\Omega</math></u>	C 19
15		20	Measure winding resistance of pressure regulator. Term. 2 to Term. 18.	<u>4.5 ... 9 <math>\Omega</math></u>	C 21
16	3	20	Measure supply voltage 1 for transmission control. Term. 10 to Term. 22. Relay and warning lamp for transmission control. lamp. Switch on ignition.	<u>10 ... 15 V</u> Warning lamp for transmission control comes on.	C 23
17	4	20	Measure supply voltage 2 for transmission control. Term. 18 to Term. 22.	Press button 3 <u>10 ... 15 V</u> Warning lamp for transmission control goes out.	D 1
18	5	20	Selector switch in position 1. Measure voltage. Term. 12 to Term. 22.	<u>Greater than 6 V</u>	D 3

**A5**

Rapid diagnosis chart

Electronic transmission control BMW



**A6**

Rapid diagnosis chart

Electronic transmission control BMW



# Rapid diagnosis chart for universal test adapter (continued)

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	<u>Test specifications (reading)</u>	<u>For trouble-shooting see Coordinate</u>
	V	$\Omega$			
19	5	20	Selector switch in position 2. Measure voltage. Term. 12 to Term. 22.	<u>less than 1 V</u>	D 5
20	6	20	Selector switch in position 2. Measure voltage. Term. 13 to Term. 22	<u>greater than 6 V</u>	D 7
21	6	20	Selector switch in position 3. Measure voltage. Term. 13 to Term. 22.	<u>less than 1 V</u>	D 9
22	7	20	Selector switch in position 3. Measure voltage. Term. 28 to Term. 22.	<u>greater than 6 V</u>	D 11
23	7	20	Selector switch in position D. Measure voltage. Term. 28 to Term. 22.	<u>less than 1 V</u>	D 13
24	8	20	Selector switch in position D. Measure voltage. Term. 29 to Term. 22.	<u>greater than 6 V</u>	D 15
25	8	20	Selector switch in position N. Measure voltage. Term. 29 to Term. 22.	<u>less than 1 V</u>	D 17
26	9	20	Selector switch in position N. Measure voltage. Term. 30 to Term. 22.	<u>greater than 6 V</u>	D 19
27	9	20	Selector switch in position R. Measure voltage. Term. 30 to Term. 22.	<u>less than 1 V</u>	D 21
28	9	20	Selector switch in position P. Measure voltage. Term. 30 to Term. 22.	<u>less than 1 V</u>	D 23
29	10	20	Program switch in position E. Measure voltage. Term. 34 to Term. 22.	<u>greater than 4 V</u>	E 1
30	10	20	Program switch in position 3·2·1. Measure voltage. Term. 34 to Term. 22.	<u>less than 0.8 V</u>	E 3

**A7**

Rapid diagnosis chart

Electronic transmission control BMW



**A8**

Rapid diagnosis chart

Electronic transmission control BMW



# Rapid diagnosis chart for universal test adapter (continued)

Test step	Switch position		Remarks	Test specification (reading)	For trouble-shooting see Coordinate
	V	$\Omega$			
31	11	20	Connect sockets 1 and 2 with a lead or with the ammeter (1.5 A). Selector switch in position N. Connect control unit. Let engine idle. Set program switch to position S. Measure voltage (Term. 17 to Term. 22). Follow the sequence of operations.	10 ... 15 V	E 5
32	12	20	As test step 31, but Term. 7 to Term. 22.	10 ... 15 V	E 7
33	13	20	As test step 31, but measure Term. 5 to Term. 22.	less than 1 V	E 9
34	14	20	As test step 31, but measure Term. 6 to Term. 22.	less than 1 V	E 11
35	15	20	Drive vehicle onto chassis dynamometer. Program switch in position S. Selector switch in position D. Raise driving speed without load slowly to approx. 20 km/h. Term. 7 to Term. 22.	less than 1 V at approx. 20 km/h	E 13
36	16	20	As test step 35, but driving speed approx. 40 km/h. Term. 5 to Term. 22.	10 ... 15 V at approx. 40 km/h	E 15
37	17	20	As test step 35, but driving speed approx. 80 km/h. Term. 6 to Term. 22.	10 ... 15 V at approx. 80 km/h	E 17
38	18	20	As test step 35, but driving speed approx. 100 km/h. Approach 100 km/h very slowly. Term. 17 to Term. 22.	less than 1 V at approx. 100 km/h	E 19

**A9**

Rapid diagnosis chart

Electronic transmission control BMW



**A10**

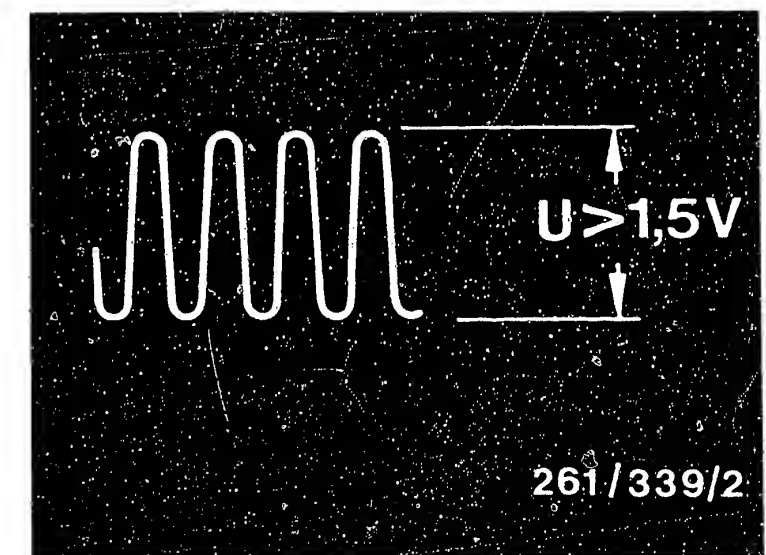
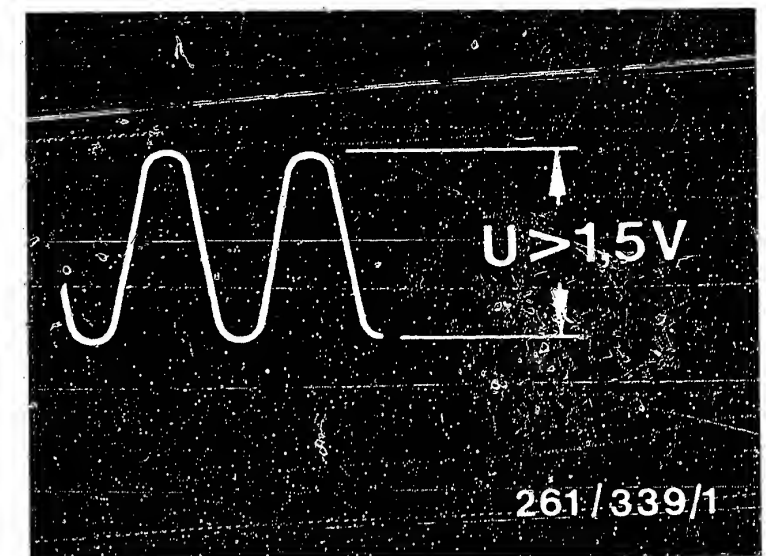
Rapid diagnosis chart

Electronic transmission control BMW



# Rapid diagnosis chart for universal test adapter (continued)

Test step	Switch position		Remarks	Test specifications (reading)	For trouble-shooting see coordinate
	V	$\Omega$			
39	18	20	Drive vehicle onto chassis dynamometer. Program switch in position "S". Gear-selector switch in position "D". Engine idling. Measure current at sockets 1 and 2. Current rise in lead 2.	635 CSi, 732i, 735i: <u>950...1050 mA</u> 745i: <u>930...1030 mA</u> at idle	E 21
40	18	20	As test step 39, but press button T1 and accelerate engine. Idle contact on throttle valve opens.	635 CSi, 732i, 735i: <u>580...680 mA</u> 745i: <u>410...510 mA</u> with button T1 pressed	F 23
41	2	20	Connect oscilloscope at test wells. Otherwise as test step 39, but driving speed approx. 10 km/h. Measure rotational-speed sensor signal term. 8 to term. 22.	<u>See top graph</u>	F 1
42	2	20	As test step 41, but driving speed approx. 20 km/h. Increase in signal frequency and voltage amplitude.	<u>See bottom graph</u>	F 3



**A11**

Rapid diagnosis chart  
Electronic transmission control BMW



**A12**

Rapid diagnosis chart  
Electronic transmission control BMW



### 3. Test specifications

The stated test specifications apply to measurements directly at the component or at the 35-pin plug without test adapter connected.

Rotational-speed sensor (in transmission):

0.7 ... 1.8 k $\Omega$

**B22**

Program switch in position E and 3 2 1:

0  $\Omega$  to ground in each case

**C9**

Kick-down switch actuated:

0  $\Omega$

**C11**

Solenoid-operated valves (in transmission) MV 1 and MV 2, reverse-gear lock and converter clutch, each:

22 ... 60  $\Omega$

**C13**

Pressure regulator (in transmission):

1.7 ... 4.5  $\Omega$

**C21**

Gear-selector switch in position 1, 2, 3, D, N, R, P

U<sub>B</sub> with ignition on.

**D3**

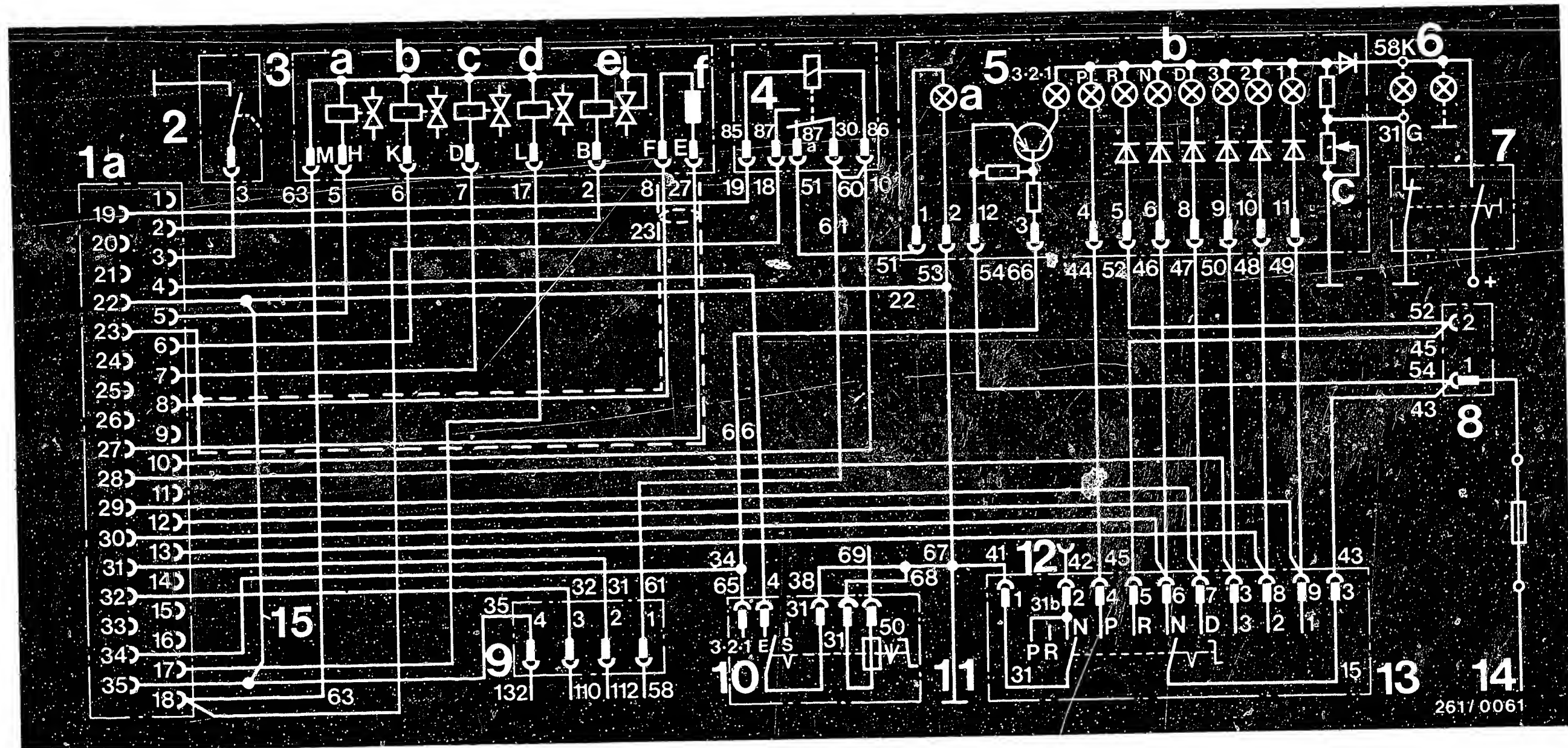
**A13**

Test specifications

Electronic transmission control BMW







#### 4. Electrical terminal diagram

1a = Transmission control

Wiring-harness plug

Control-unit end

2 = Kick-down switch

3 = Transmission

3a = Solenoid-operated valve 1

3b = Solenoid-operated valve 2

3c = Solenoid-operated valve - reverse gear  
lock

3d = Solenoid-operated valve - converter  
clutch

3e = Pressure regulator

3f = Output speed sensor

4 = Transmission relay

5 = Indicator unit

5a = Warning lamp for electronic  
transmission control

5b = Gear indicator

**A14**

Electrical terminal diagram

Electronic transmission control BMW

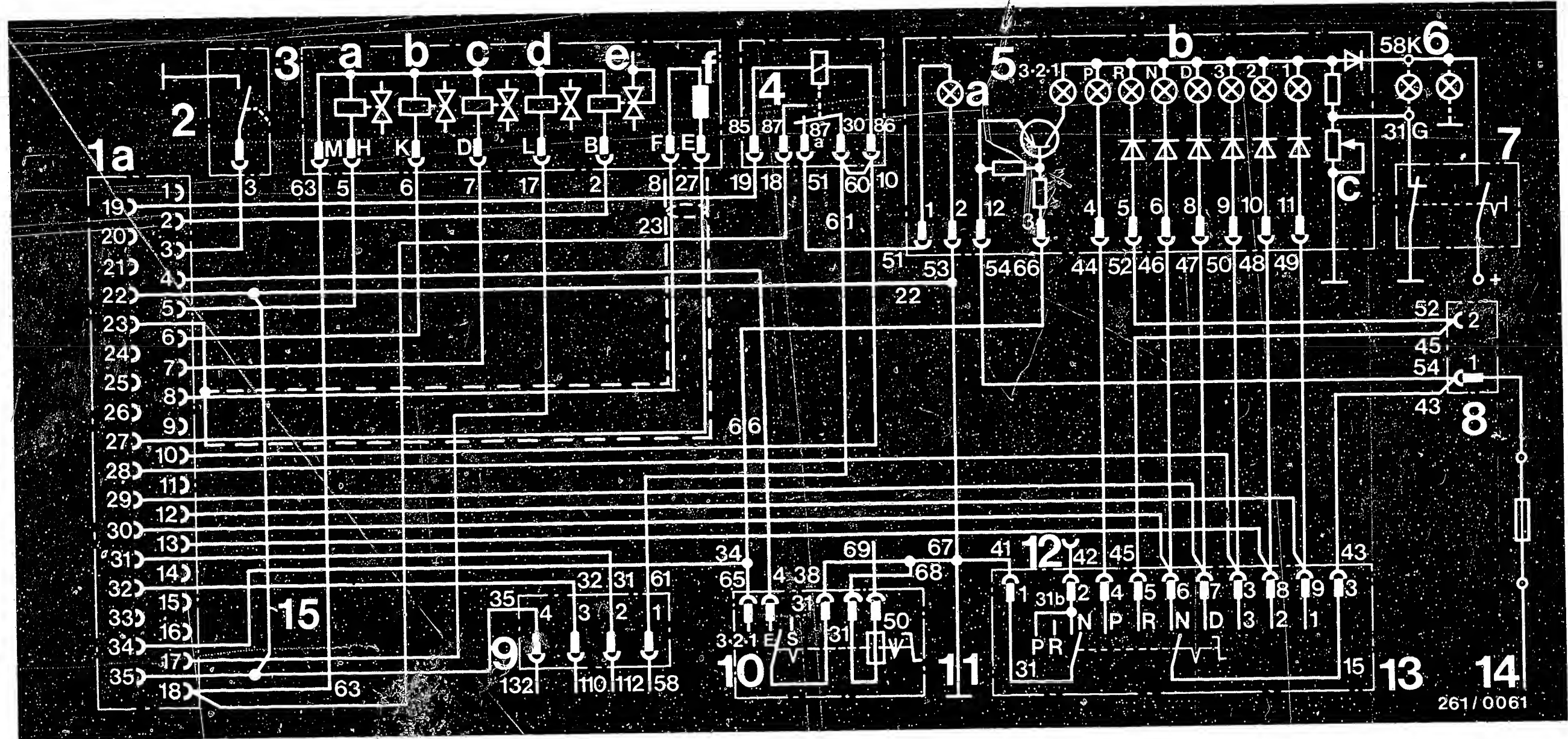


**A15**

Electrical terminal diagram

Electronic transmission control BMW





#### 4. Electrical terminal diagram (continued)

5c = Brightness control  
 6 = Instrument illumination  
 7 = Light switch  
 8 = Backup lamp  
 9 = Plug connector with lead (7 series);  
 (58 to main relay term. 87;  
 110, 112, 132 only 745i;  
 to knock control unit)

10 = Programme switch  
 (69 = To Term. 50 on starting motor)  
 11 = Instrument carrier ground point  
 12 = To starting disable relay Term. 85  
 13 = Selector switch (drive mode)  
 14 = To ignition and starting switch Term. 15  
 15 = Connection not with 745i

**A16**

Electrical terminal diagram

Electronic transmission control BMW



**A17**

Electrical terminal diagram

Electronic transmission control BMW



261/0061

## 5. Installation position of components

Control unit (combined with Motronic):

7 series: In front-passenger footwell behind right-hand side panel.

6 series: In glove compartment.

Speed sensor	)	
Solenoid-operated valves	)	in transmission
Pressure regulator	)	

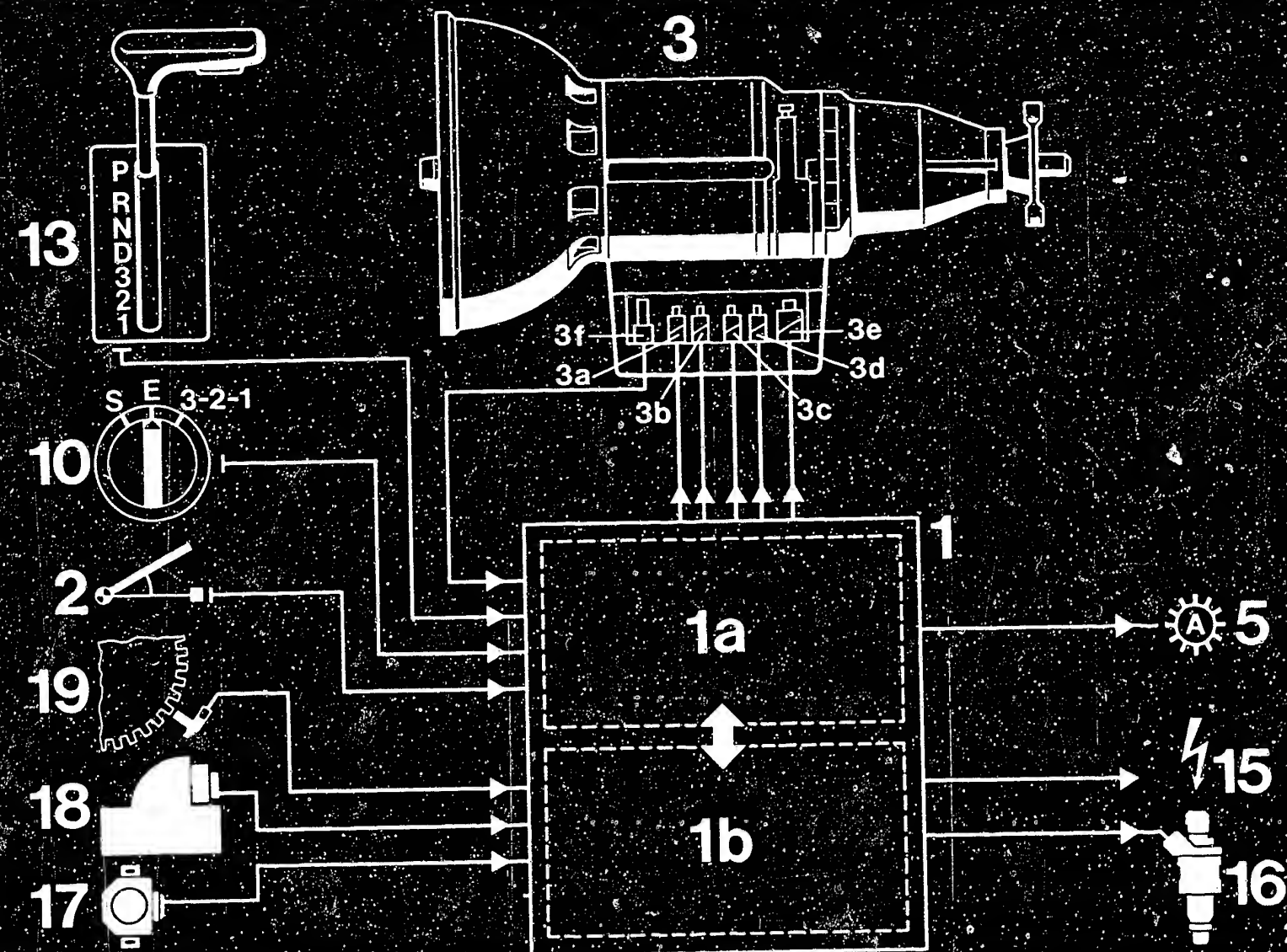
Relay for transmission control: In front-passenger footwell behind right-hand side panel.

Selector switch	)	
Program switch	)	on driver's console

Indicator unit	)	
Warning lamp for	)	
electron. transmission	)	in instrument panel
control	)	

Kick-down switch: Under accelerator





261/0062

## 6. Basic circuit diagram

1 = Electronic control unit  
 1a = Transmission control  
 1b = Motronic  
 2 = Kick-down switch  
 3 = Transmission  
 3a, 3b = Solenoid-operated valves for gear shifting

3c = Solenoid-operated valve - reverse gear lock  
 3d = Solenoid-operated valve - converter clutch  
 3e = Pressure regulator  
 3f = Output speed sensor  
 5a = Warning lamp for electronic transmission control

10 = Program switch  
 13 = Selector switch  
 15 = Ignition  
 16 = Injection  
 17 = Throttle-valve switch  
 18 = Air-flow sensor  
 19 = Engine-speed sensor

**A19**

Basic circuit diagram

Electronic transmission control BMW



**A20**

Basic circuit diagram

Electronic transmission control BMW





## 7. Test equipment and tools

Universal test adapter	ETT 018.01	0 684 101 801
Adapter lead		1 684 463 140
Motortester	e.g. MOT 002.00 or 200	0 684 000 200
Multimeter (analog display, internal resistance min. 20 k $\Omega$ /V)		Commercially available e.g. Metrawatt GmbH, type MA2H or Chinaglia, type Cortina
Chassis dynamometer	e.g. LPS 96 or LPS 002	0 680 017 001 0 680 100 200



## 8. Important general information

The electronic transmission control and the Motronic have a joint control unit. For this reason, this manual also includes special information for the Motronic.

Be sure to follow the information in order to prevent damage to transmission, engine, control unit or ignition coil, and also to avoid danger to persons.

8.1 Never start the engine without securely connected battery.

8.2 Incorrect polarity of the supply voltage, e.g. through incorrect connection of battery or ignition coil, may lead to the destruction of the control unit.

8.3 Do not use a fast charger for starting the engine.

Starting ~~aid~~ should be exclusively by means of a second 12 V ~~battery~~ and jump leads.

Caution! Due to different requirements of vehicle manufacturers as regards electronic products, we recommend that 24 V batteries not be used as a starting aid. Observe the instructions in the vehicle owner's manual.

8.4 Disconnect the battery from the vehicle electrical system before fast charging.

Observe the operating instructions for the fast charger.

8.5 Do not disconnect the battery from the vehicle electrical system with the engine running.

8.6 Do not short ignition coil Term. 1 to ground (e.g. for stopping the engine). Ignition coil and, possibly, control unit will be destroyed.



8.7 Battery + must not be connected to ignition coil Term. 1. Control unit will be destroyed.

8.8 Never connect or disconnect wiring-harness plug of control unit with ignition on.

8.9 Remove the control room unit at temperatures above 80 °C (e.g. paint-drying installation).

8.10 Remove the control unit before carrying out welding work (electric spot welding).

8.11 Before compression test, remove plug from relay set. This prevents undesired injecting of the injection valves.

8.12 If installing an alarm system, follow the installation instructions for Motronic vehicles or Technical Bulletin "New Product" VDT-I-335/110.

It must be ensured that the alarm relay is not subjected to interference from extraneous fields (e.g. from H.T. ignition cables), thus causing it to trip incorrectly.

8.13 The Motronic with transmission control contains a high-energy ignition system which can be very dangerous if live parts or terminals are touched (both on the primary as well as secondary side).

In this connection, we should like to point out that the VDE regulations, in particular VDE 01 04/67, must be observed when working on or testing the ignition system.



Always switch off the ignition when working on the ignition coil (switch off ignition/voltage source). Such work includes:

- Connection of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of parts of the ignition system (spark plug, ignition coil, high-voltage distributor, ignition cable etc.).

If, when testing the ignition system or when performing adjustment operations on the engine, it becomes necessary to switch on the ignition, (switch on ignition or voltage source), the above-mentioned dangerous voltages occur over the entire system.

The danger of accident exists, therefore, not only on the individual components of the ignition system (e.g. high-voltage distributor, ignition coil, control unit and ignition harness), but also on the wiring harness (e.g. tachometer connection, diagnostic plug), at plug-in connections and on testers.

#### Transmission oil

In the case of automatic transmissions, even slight deviations from the prescribed oil level or incorrect grade of oil can lead to a noticeable deterioration in the quality of gear-shifting. In the case of major deviations, even incorrect shifting is possible.





## 9. Trouble-shooting

### 9.1 Important information

Motronic and transmission control use a common control unit and, in some cases, the same sensors.

For this reason, the functioning of the transmission control presupposes that the Motronic is in proper working order.

This means that, in the event of a total failure or complaints as regards driveability, it is necessary first of all to check the Motronic. If, however, it is clear that the transmission control is the cause and complete testing of the Motronic is to be dispensed with, it is necessary in any case to check the temperature sensor NTC II (coolant), the engine speed, the air-flow sensor as well as the idle and full-load contacts, and, for the 745i, the full-load function of the knock control unit.

The customer complaints listed below and their causes refer exclusively to components of the electronic transmission control. Other customer complaints regarding the transmission control are to be found in the transmission mechanism, in the gearbox, on the hydraulic control unit and in the mechanism of the selector lever, program switch and selector switch. The last-mentioned components are not supplied by Bosch.

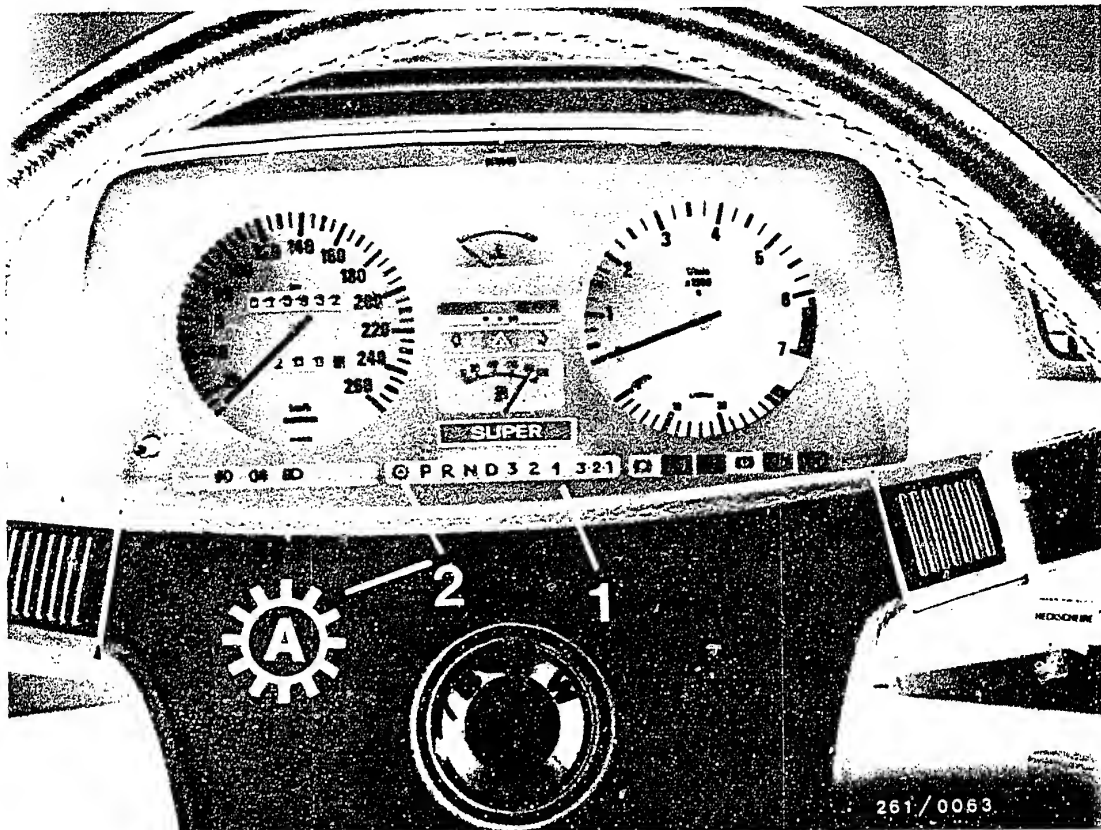
The repair of the components and of the transmission is not intended. The transmission must be repaired in a specialist workshop and is available as an exchange transmission.



All the causes (component faults) listed in the table are covered by the universal test adapter. The table provides a better overview and gives information on the relationship between cause and effect on driveability. Basically, it is advisable to carry out the entire test program with the universal test adapter.

Both a defective control unit as well as defective components ~~can~~ lead to mutual damage. For example, a short-circuit to ground on the solenoid-operated valve may lead to the destruction of the control unit.





1 = Indicator unit

2 = Warning lamp for electronic transmission control

## 9.2 Function of warning lamp for electronic transmission control

After switching on the ignition, the warning lamp lights up. Whenever the engine is started, the electronic control unit performs a self-check. The warning lamp goes out if there is no fault.

Even while the vehicle is moving, the electronic control unit monitors the functions which are necessary for operation in order to prevent critical situations or to prevent the engine from overrevving on the overrun.



The following causes lead to the warning lamp lighting up:

- Failure of speed sensor or of solenoid-operated valves
- Defective output stage in control unit
- Defective circuit components in control unit
- Overrevving of engine
- Incorrect shifting down into 2nd gear.

With the lighting up of the warning lamp the transmission relay switches off the power supply to the solenoid-operated valves and the pressure regulator.

The effect of the safety function is that it is possible to continue driving in 3rd gear. Likewise, reverse gear can still be selected, but the reverse gear lock is ineffective.

The fault information is cleared after switching off the ignition.

Note: Not every fault which has led to the warning lamp lighting up will cause it to light up again after renewed starting of the engine and after repeated driving.



# Trouble-shooting according to customer complaints

1. Warning lamp for electronic transmission control lights up

2. Engine fails to start

3. Engine stalls with drive mode selected

4. No gear-shifting or gear-shifting not correct

5. Gear shifts not smooth

6. Manual shifting down from 3 to 2 or from 2 to 1 not O.K.

7. Jerk when shifting from P to R or from N to R

8. Reverse gear cannot be selected

Cause (component fault)

Coordinate

●	●	●	●	●	●	●	●	Test with universal test adapter (covers all components)	Starting on B9
	●							Set selector switch, or selector switch defective	D3...D24
		●						Program switch defective	C5, C9, E1...E4
		●						Kick-down switch defective, contact O.K.?	C1, C11
●								Transmission relay defective	C23, D1
●			●					Plug on transmission not plugged on or defective	--
●			●					Fuse for transmission control defective	--
	●		●					Ground terminal open circuit or with contact resistance	C7
				●				Lead to pressure regulator shorting to ground	C21
		●						Lead to solenoid-operated valve shorting to ground (Consequential damage: Control unit may be defective)	C3, C13...C19

**B5**

Trouble-shooting

Electronic transmission control BMW



**B6**

Trouble-shooting

Electronic transmission control BMW



1. Warning lamp for electronic transmission control lights up

2. Engine fails to start

3. Engine stalls with drive mode selected

4. No gear-shifting or gear-shifting not correct

5. Gear shifts not smooth

6. Manual shifting down from 3 to 2 or from 2 to 1 not O.K.

7. Jerk when shifting from P to R or from N to R

8. Reverse gear cannot be selected

								Cause (component fault)	Coordinate
			●					Lead to speed sensor shorting to ground	B16...B21
			●					Speed sensor defective (replace transmission)	B22, F1...F4
				●		●		Pressure regulator defective (replace transmission)	C21
			●					Solenoid-operated valves defective (replace transmission)	C13...C18
		●						Converter clutch not releasing (replace transmission)	C19
●	●	●	●	●	●	●	●	Electronic control unit defective. Only replace control unit if the above-mentioned causes can be ruled out.	E5...E24



10. Test with universal test adapter ETT 018.01  
(0 684 101 801) and adapter lead for transmission  
control (1 684 463 140)

Connect universal test adapter to transmission wiring harness (ignition must be off).

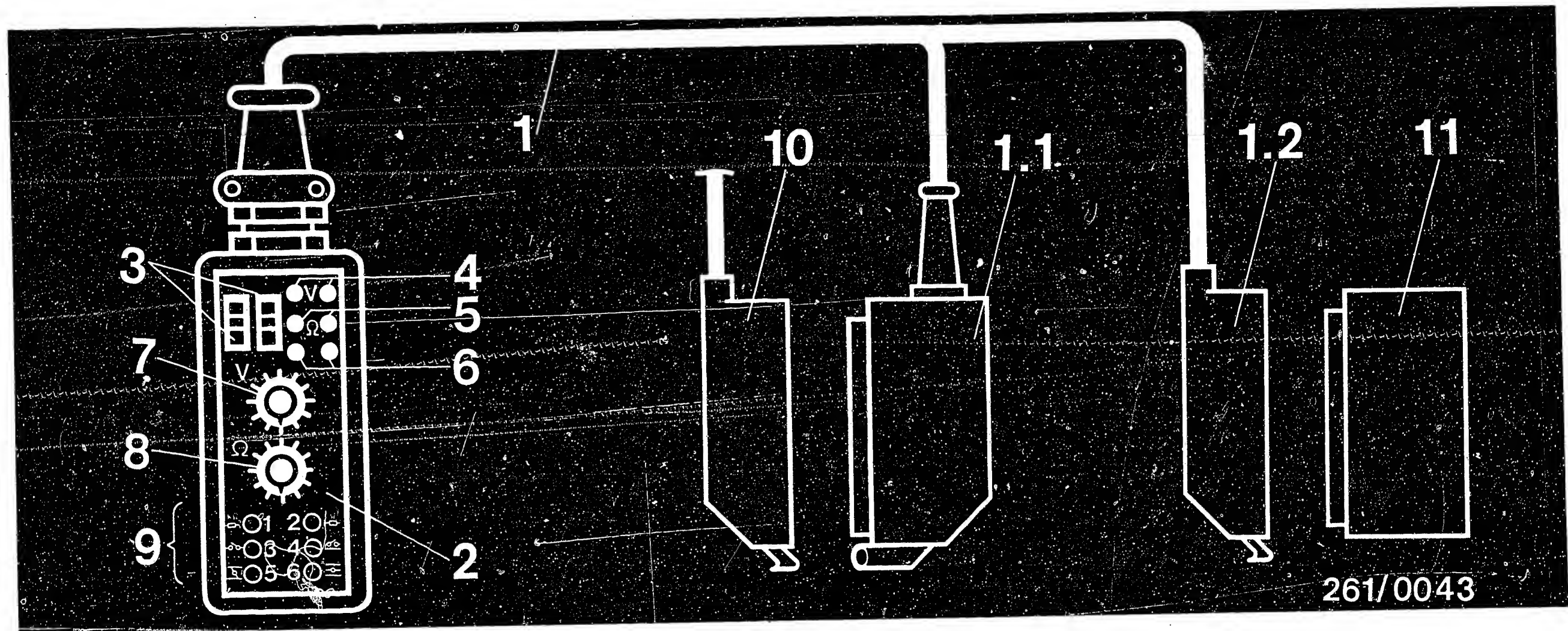
For testing the wiring harness and the components connected to it, only the transmission wiring harness must be connected, but not the control unit. Be sure to follow the instructions in the test chart.

In order to make readings, a measuring instrument for voltage, current and resistance (multimeter) as well as the motortester must be connected to the test adapter.

The program switch of the test adapter is used for selecting the individual test steps. The symbols "V" and " $\Omega$ " show the operator whether voltage or resistance is being measured. Some switch positions are also required for simulation with the engine running. By pressing the buttons with the control unit connected and the engine running it is possible to intentionally change, i.e. to simulate, operating conditions. Thus, for example, with the engine running, it is possible by pressing button T1 to make the control unit think that the kick-down switch has been actuated, and then the reaction of the control unit can be evaluated on the multimeter.

If necessary, the circuit diagram can be used for trouble-shooting.





261/0043

# Universal test adapter with adapter lead for transmission control

- 1 = Adapter lead
- 1.1 = Connection to wiring harness
- 1.2 = Connection to control unit
- 2 = Universal adapter (part no.: 0 684 001 801)
- 3 = Test wells (for motortester)
- 4 = Test sockets (for voltage measurement)
- 5 = Test sockets (for resistance measurement)
- 6 = Test sockets (for current measurement)
- 7 = Program switch "V"
- 8 = Program switch "Ω"

- 9 = Button panel for simulation of operating conditions
- 10 = Transmission wiring harness
- 11 = Control unit
- Button 1 = Simulation of kick-down switch
- Button 2 = Not occupied
- Button 3 = Energization for transmission relay
- Button 4 = Not occupied
- Button 5 = Not occupied
- Button 6 = Not occupied

**B 10**

Test with universal test adapter  
Electronic transmission control BMW

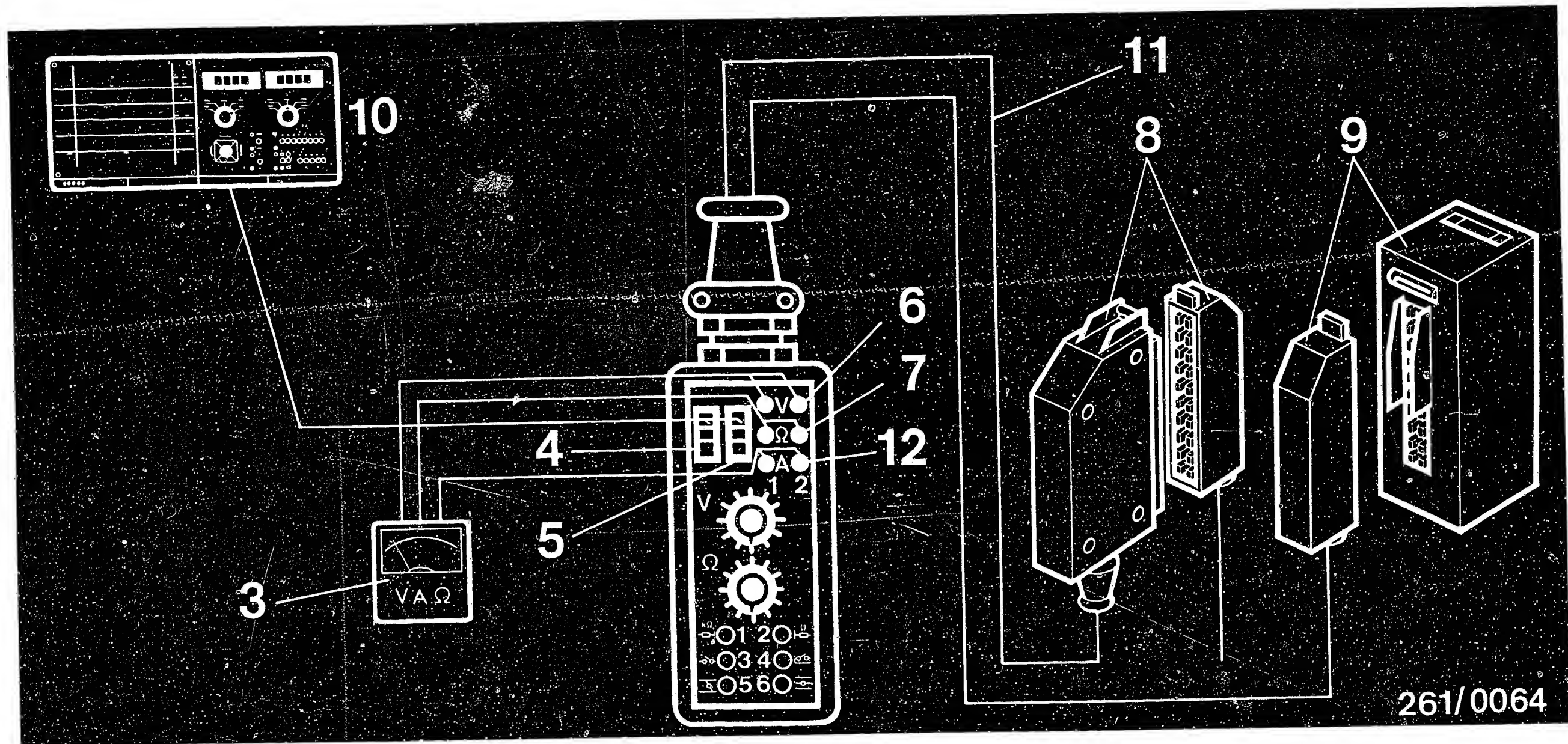


**B 11**

Test with universal test adapter  
Electronic transmission control BMW







#### Terminal diagram for universal test adapter

- 3 = Multimeter
- 4 = Red connection socket (test well) for red terminal of motortester
- 5 = Black connection socket (test well) for black terminal of motortester
- 6 = Connection of voltmeter to V sockets (red = +, black = ground or -)

- 7 = Connection of ohmmeter to  $\Omega$  sockets (blue)
- 8 = Connection to transmission wiring harness
- 9 = Connection to transmission control unit
- 10 = Motortester
- 11 = Adapter lead for transmission control
- 12 = Connection of ammeter (black sockets, 1 = -, 2 = +)

**B 12**

Test with universal test adapter  
Electronic transmission control BMW



**B 13**

Test with universal test adapter  
Electronic transmission control BMW



## Preparations for testing with universal test adapter

Remove control unit and connect test adapter.

Installation position of control unit: 7 series: In front passenger footwell  
behind right-hand side panel.  
6 series: In glove compartment

To remove, push the detent to the rear, hinge up plug in direction of arrow and unhook.

The control unit is fastened by 4 screws (see bottom picture).

### Notes:

To rule out any confusion between the plugs of the different systems, a mechanical latching method has been introduced. The "lug" (pivot point when opening and connecting the control unit) and the corresponding mount on the control unit have matching recesses and pins.

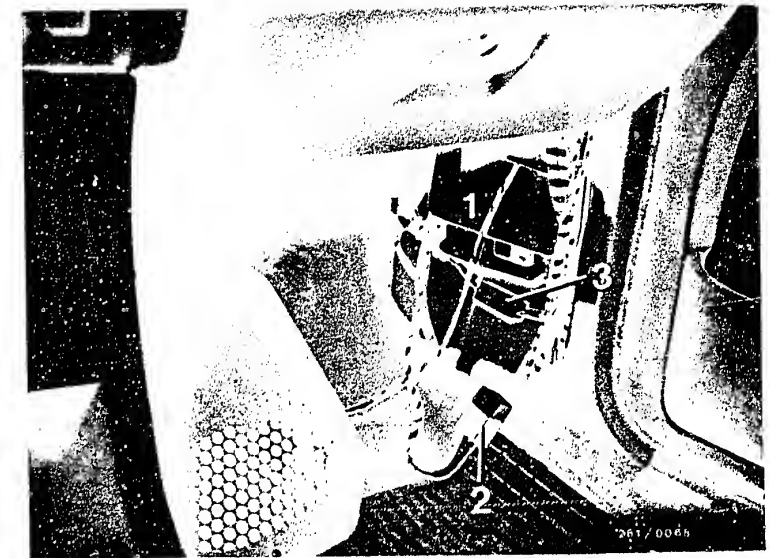
In addition to this mechanical latching method, the two 35-pin plugs have been marked differently. The transmission plug has a yellow cable binder, and the Motronic plug has a green cable binder.

As a basic rule of trouble-shooting it should be noted that all plug connections must be checked for security, good contact and corrosion. The spring contacts in the plug connectors must be latched in position and must not allow themselves to be pushed back.

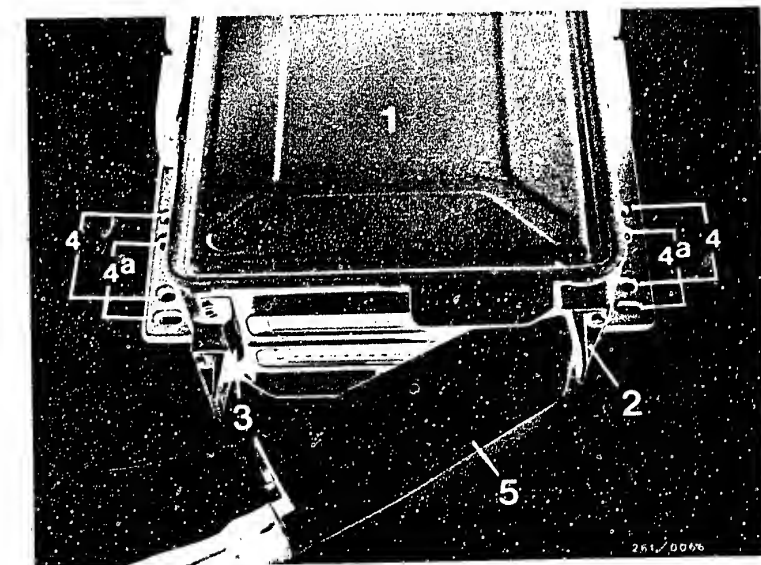
Where the instruction "test lead" appears in the trouble-shooting, this means: Test the lead for continuity, short circuit to ground and contact with other leads. Watch for signs of wear and pinching.

### Note:

In the following test steps a white border in the "Operation" column indicates which operation has to be changed compared to the preceding test step.



- 1 = Control unit (7 series)
- 2 = Transmission relay
- 3 = 4-pin plug connector
- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug



**B 14**

Test with universal test adapter  
Electronic transmission control BMW



**B 15**

Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 1 Control unit not connected

Operation:

Program switch "V" at position



Program switch "Ω" at position

1

Measuring equipment:

Ohmmeter

Measuring range:

1 M Ω

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition

Selector switch in position P

Reading:

On multimeter:

Greater than 100 kΩ

If reading O.K.,  
continue testing with  
next test step.

Testing:

Component:

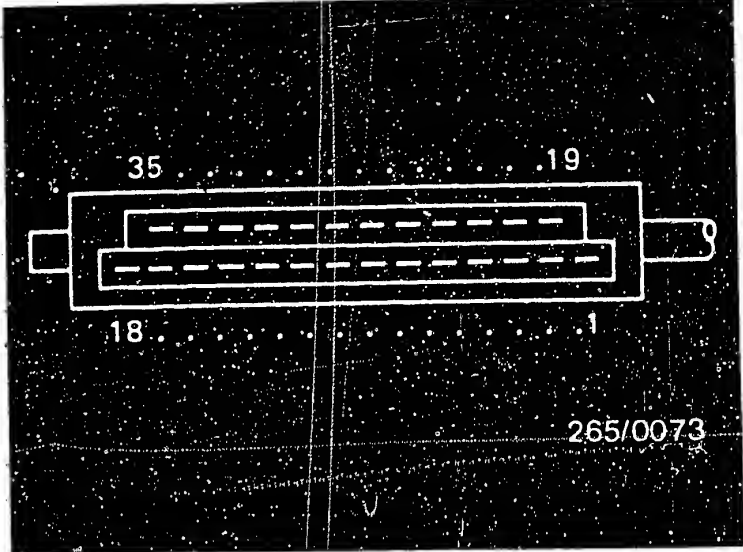
Speed sensor

Operation:

Insulation of Term. 23  
(shielding) from Term. 22  
(ground)

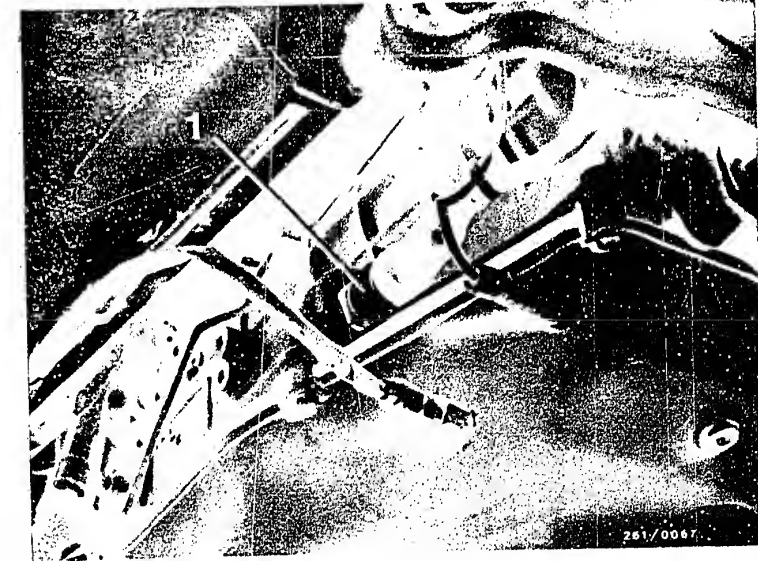
Malfunction:

Resistance less than 100 kΩ



Top view of 35-pin multiple  
plug of transmission wiring  
harness

1 = Plug connector on  
transmission



Trouble-shooting:

Check shielding (on Term. 23) for short circuit to ground.  
Watch for damage to lead to transmission.

B16

Test with universal test adapter  
Electronic transmission control BMW

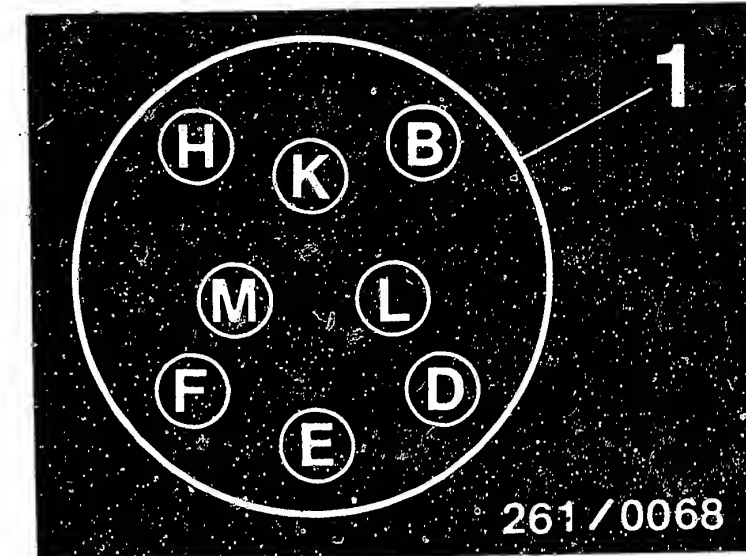


B17

Test with universal test adapter  
Electronic transmission control BMW

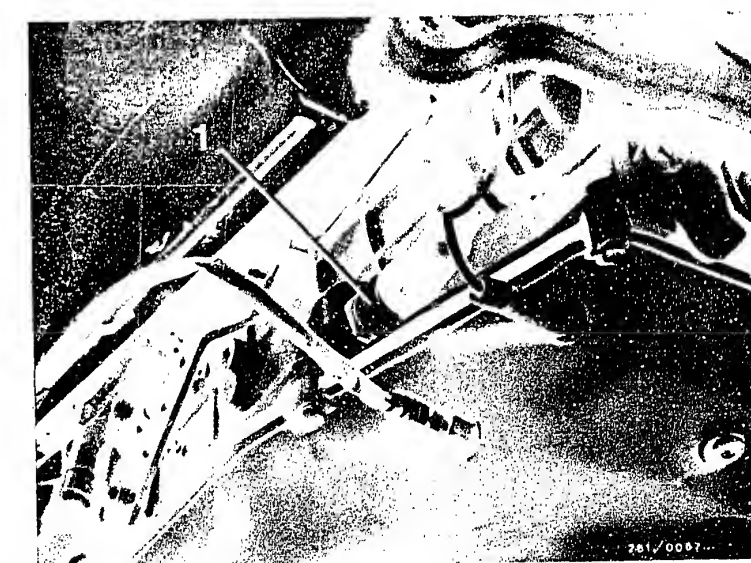


TEST STEP 2		
Operation:		Reading:
Program switch "V" at position	↓	On multimeter: Greater than 100 k $\Omega$
Program switch "Ω" at position	2	
Measuring equipment: Ohmmeter		
Measuring range: 1 M $\Omega$		If reading O.K., continue testing with next test step.
Connection: Test sockets	Ω	
Operation in vehicle: Switch off ignition Selector switch in position P		
		Testing:
		Component: Speed sensor
		Operation: Insulation of Term. 8 from Term. 22 (ground)
		Malfunction: Resistance less than 100 k $\Omega$



1 = Top view of plug part on transmission

1 = Plug connector on transmission



#### Trouble-shooting:

Resistance approx. 0  $\Omega$  or less than 100 k $\Omega$ :

Check lead to Term. 8 for short circuit to ground. To do this, remove plug from transmission.

Resistance approx. 1.1 k $\Omega$  or less than 100 k $\Omega$ :

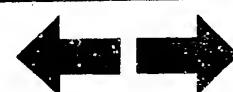
Check lead to Term. 27 for short circuit to ground. To do this, remove plug from transmission.

If leads to speed sensor in transmission O.K., on plug section on transmission test terminals E and F from speed sensor for short circuit to ground.

If short circuit to ground in transmission, the transmission must be replaced.

**B 18**

Test with universal test adapter  
Electronic transmission control BMW



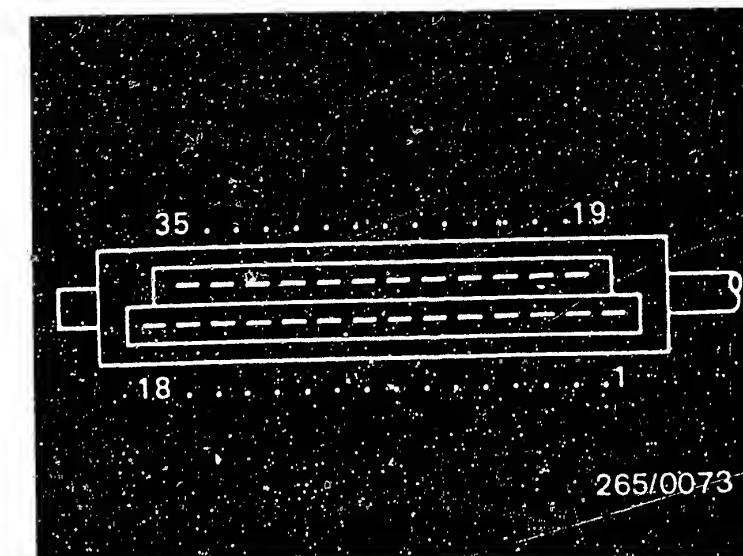
**B 19**

Test with universal test adapter  
Electronic transmission control BMW



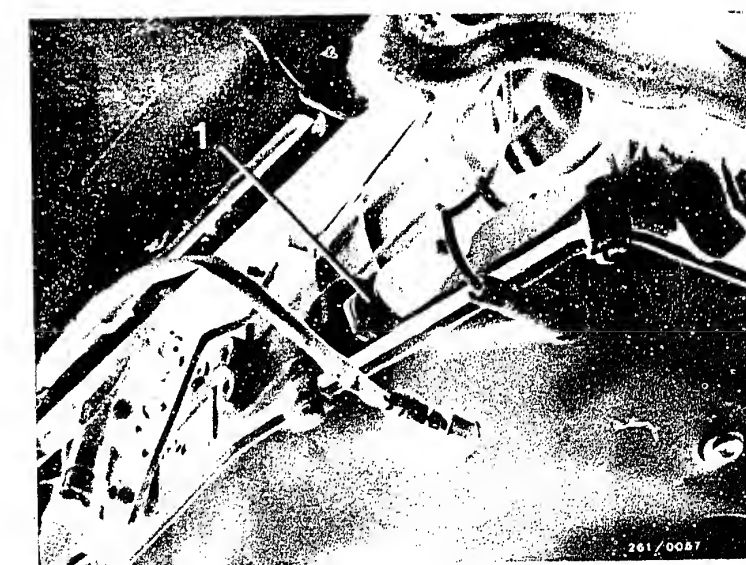


TEST STEP 3				
Operation:		Reading:	Testing:	
Program switch "V" at position	↓	On multimeter: Greater than 100 k $\Omega$	Component: Speed sensor	
Program switch "Ω" at position	3		Operation: Insulation between shielding (Term. 23) and speed sensor lead (Term. 27)	
Measuring equipment: Ohmmeter				
Measuring range: 1 M $\Omega$		If reading O.K., continue testing with next test step	Malfunction: Resistance less than 100 k $\Omega$	
Connection: Test sockets	Ω			
Operation in vehicle: Switch off ignition Selector switch in position P				



Top view of 35-pin multiple plug of transmission wiring harness

1 = Plug connector on transmission

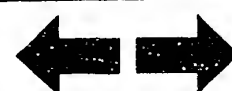


Cause: Shielding of speed-sensor lead has connection with speed sensor lead.

Trouble-shooting: Open 35-pin transmission plug. Check whether shielding is in contact with other terminals. May only be connected to Term. 23. Repair wiring harness to transmission or replace.

**B20**


Test with universal test adapter  
Electronic transmission control BMW

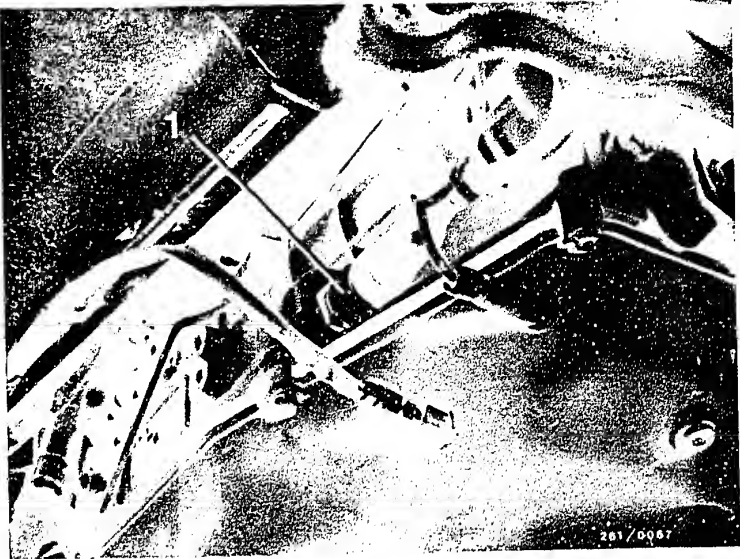


**B21**

Test with universal test adapter  
Electronic transmission control BMW

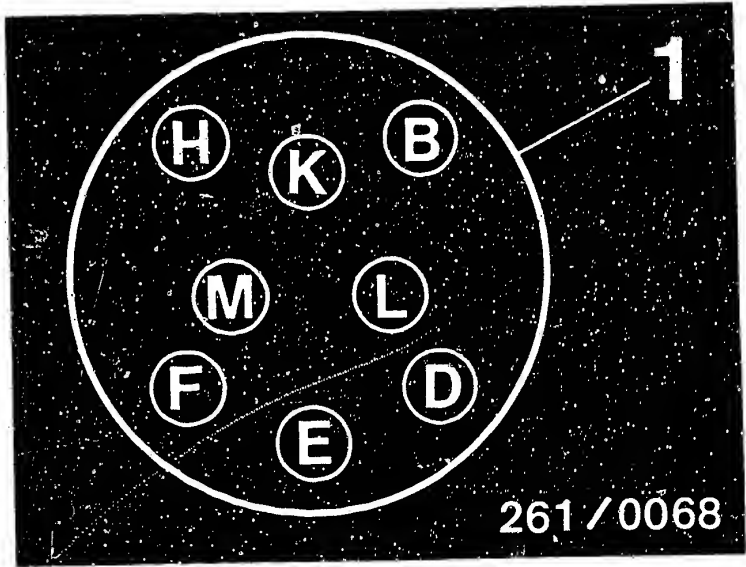


TEST STEP 4		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>		On multimeter: <u>0.7 ... 1.8 kΩ</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             <	




1 = Top view of plug section on transmission

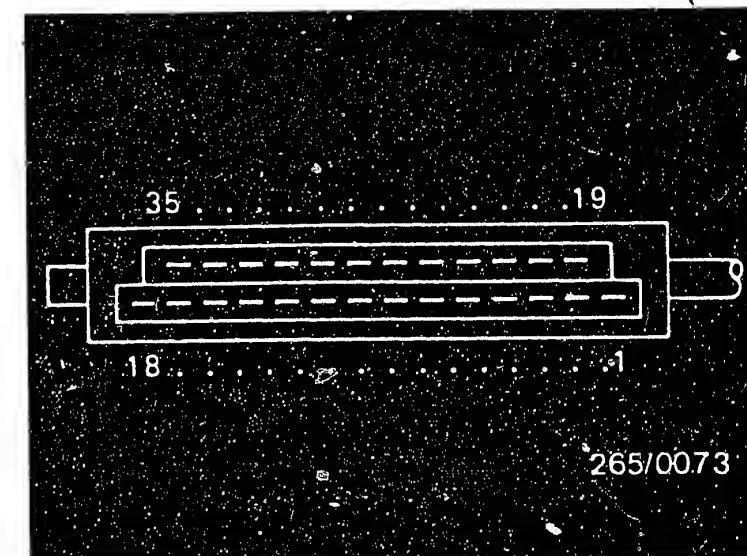
1 = Plug connector on transmission



Trouble-shooting:

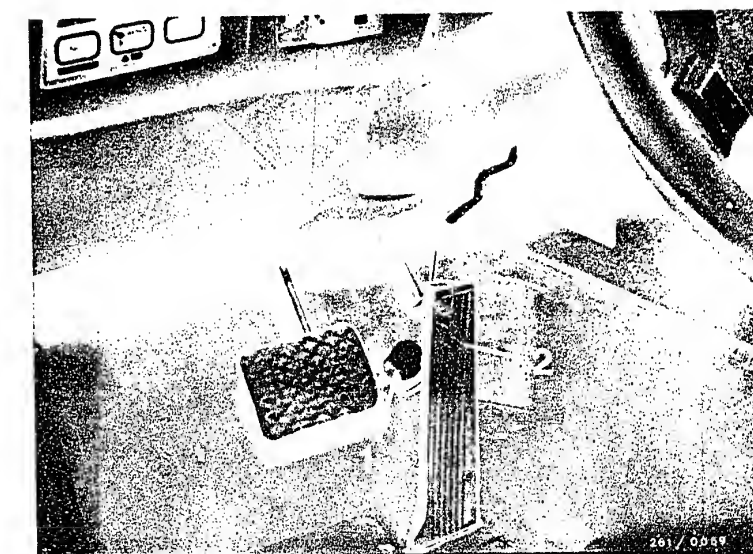
- Check plug-in connections for corrosion and proper contact.
- Measure internal resistance directly at plug section on transmission, between terminal E and F for speed sensor.  
Resistance outside tolerance: Replace transmission.  
Resistance correct: Test for continuity in leads to Term. 8 and Term. 27.


TEST STEP 5			
Operation:		Reading:	Testing:
<u>Program switch "V" at position</u>		<u>On multimeter:</u> <u>Greater than 100 kΩ</u>	<u>Component:</u> Kick-down switch
<u>Program switch "Ω" at position</u>	5	<u>Note:</u> <u>Do not operate</u> <u>accelerator</u>	
<u>Measuring equipment:</u> Ohmmeter			<u>Operation:</u> Contact opens, Shunt resistance Term. 3 to Term. 22 (ground)
<u>Measuring range:</u> 1 M Ω			
<u>Connection:</u> Test sockets	Ω		<u>Malfunction:</u> Resistance less than 100 kΩ
<u>Operation in vehicle:</u> Switch off ignition Selector switch in position P			

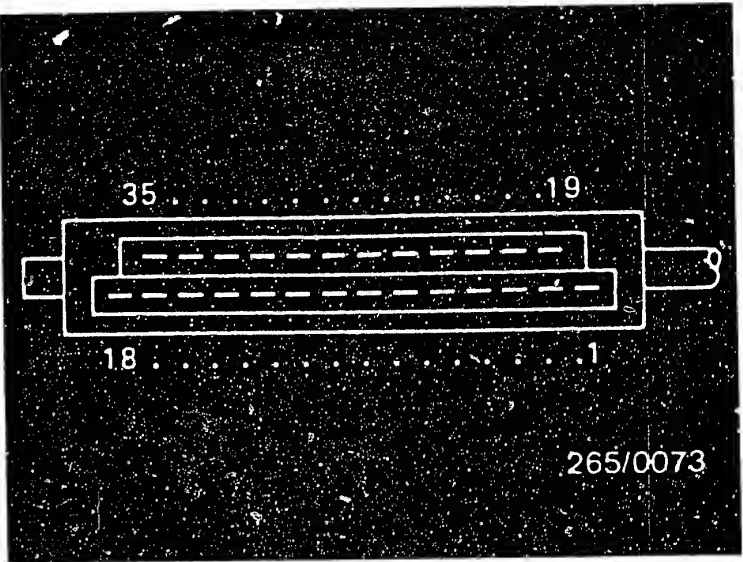


Top view of 35-pin  
multiple plug of  
transmission wiring  
harness

1 = Kick-down switch  
2 = Accelerator

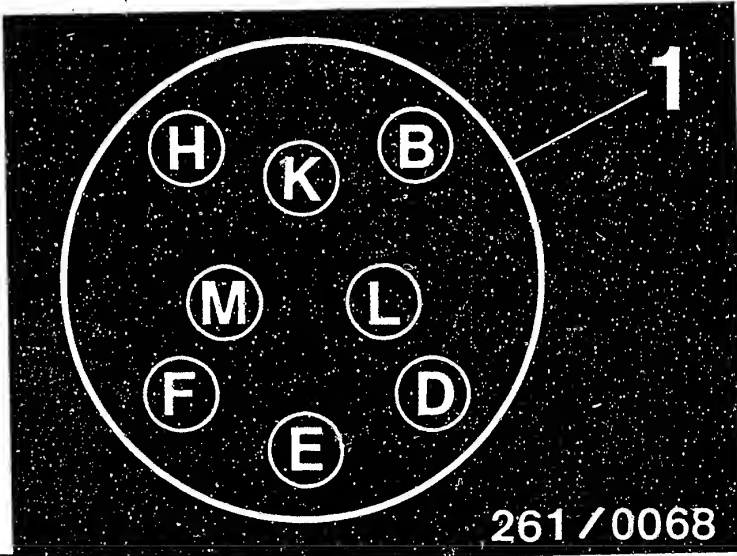


TEST STEP 6		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>		<u>On multimeter:</u> <u>Greater than 100 kΩ</u>	<u>Component:</u> Solenoid-operated valve and pressure regulator in transmission
<u>Program switch "Ω" at position</u>	11	<u>Note:</u> Do not press buttons on test adapter.	
<u>Measuring equipment:</u> Ohmmeter			<u>Operation:</u> Insulation between Term. 18 and Term. 22 (ground)
<u>Measuring range:</u> 1 M Ω			
<u>Connection:</u> Test sockets	Ω		<u>Malfunction:</u> Resistance less than 100 kΩ
<u>Operation in vehicle:</u> Switch off ignition Selector switch in position P			




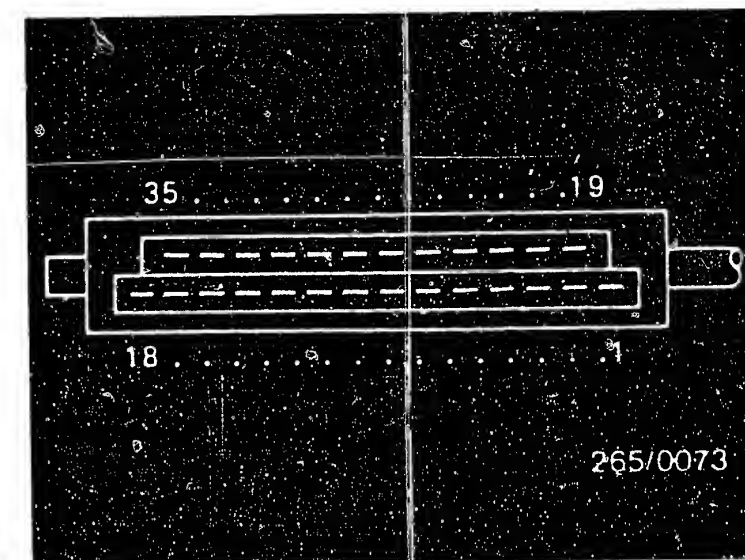
Top view of 35-pin multiple plug of transmission wiring harness

1 = Top view of plug section on transmission





TEST STEP 7		
Operation:	Reading:	Testing:
Program switch "V" at position 	On multimeter: Greater than 100 k $\Omega$	Component: Program switch
Program switch " $\Omega$ " at position 12		
Measuring equipment: Ohmmeter		Operation: Insulation between Term. 4 and Term. 22 (ground)
Measuring range: 1 M $\Omega$		
Connection: Test sockets $\Omega$	If reading O.K., continue testing with next test step.	Malfunction: Resistance less than 100 k $\Omega$
Operation in vehicle: Switch off ignition Selector switch in position P Program switch in position S		



Top view of 35-pin multiple plug of transmission wiring harness

- 1 = Selector switch  
2 = Program switch



#### Trouble-shooting:

- Test program switch for short circuit to ground.
- Test lead from control unit Term. 4 to program switch for short circuit to ground.

**C5**

Test with universal test adapter  
Electronic transmission control BMW



**C6**

Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 8 745i: Knock control unit connected.

Operation:

Program switch "V" at position



Program switch "Ω" at position

13

Measuring equipment:

Ohmmeter

Measuring range:

0 to 10 kΩ

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition  
Selector switch in position P

Reading:

On multimeter:  
General:

Less than 10 Ω

745i:

1...9 kΩ

If reading O.K.,  
continue testing with  
next test step

Testing:

Component:

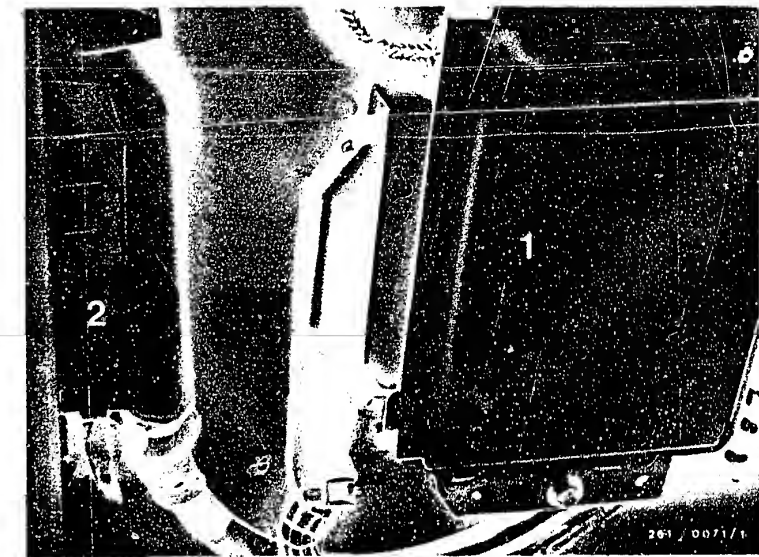
General: Lead to ground  
745i: Knock control unit

Operation:

Lead from transmission plug  
Term. 35 to Term. 22 (ground)

Malfunction:

Resistance outside tolerance



1 = Knock control unit in 745i  
2 = ABS control unit

Arrow = Ground terminal for  
transmission control

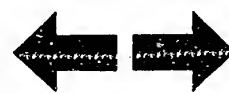
Trouble-shooting:

- 745i: . Test knock control unit plug for security and good contact.
- Test ground terminal for transmission control under instrument panel for security, good bare-metal contact and loose contact.
- 745i: Test knock control unit according to SIS microcard BMW-04/E181.



C7


Test with universal test adapter  
Electronic transmission control BMW



C8

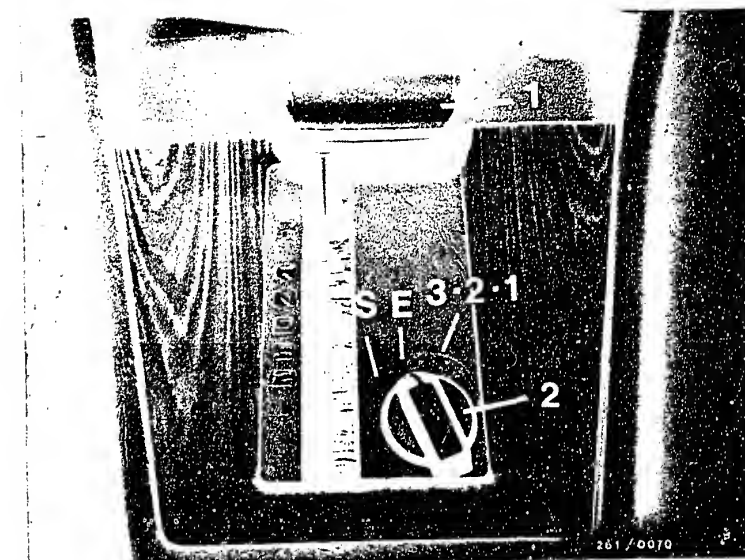
Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 9		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>		On multimeter:  <u>Less than 10 Ω</u>	<u>Component:</u>  Program switch
<u>Program switch "Ω" at position</u>	14	(Reading is influenced by protective resistor in adapter)	
<u>Measuring equipment</u>			<u>Operation:</u>  Position E for continuity (Term. 4 to Term. 22, ground)
Ohmmeter			
<u>Measuring range:</u>  0 to 10 kΩ			
<u>Connection:</u>  Test sockets	Ω	If reading O.K., continue testing with <u>next test step.</u>	<u>Malfunction:</u>  Resistance greater than 10 Ω
<u>Operation in vehicle:</u> Switch off ignition Selector switch in position P Program switch in position E			

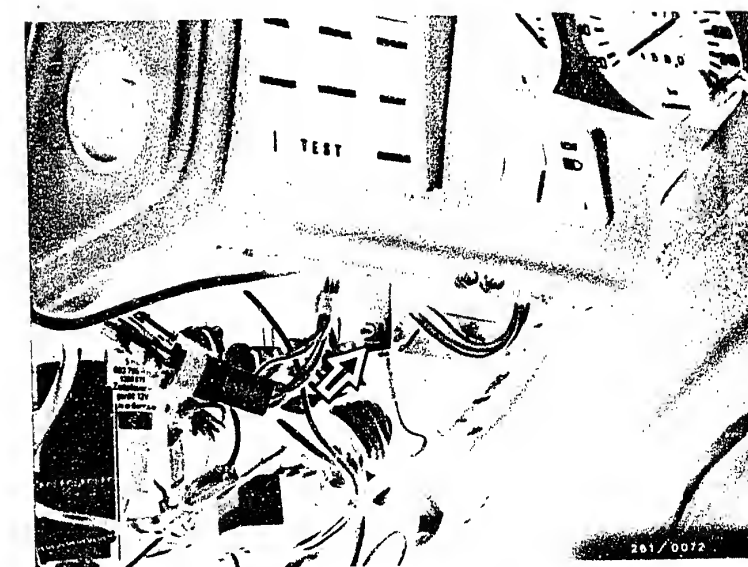
#### Trouble-shooting:

- Test ground terminal for transmission control under instrument panel for security, good bare-metal contact and loose contact.
- Test lead from ground terminal to program switch Term. 31 including plug connector for continuity.
- Test lead including plug connector from control unit Term. 4 to program switch.
- Program switch defective



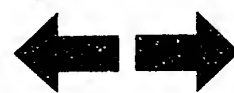
1 = Selector switch  
2 = Program switch

Arrow = Ground terminal for transmission control



**C9**

Test with universal test adapter  
Electronic transmission control BMW



**C10**

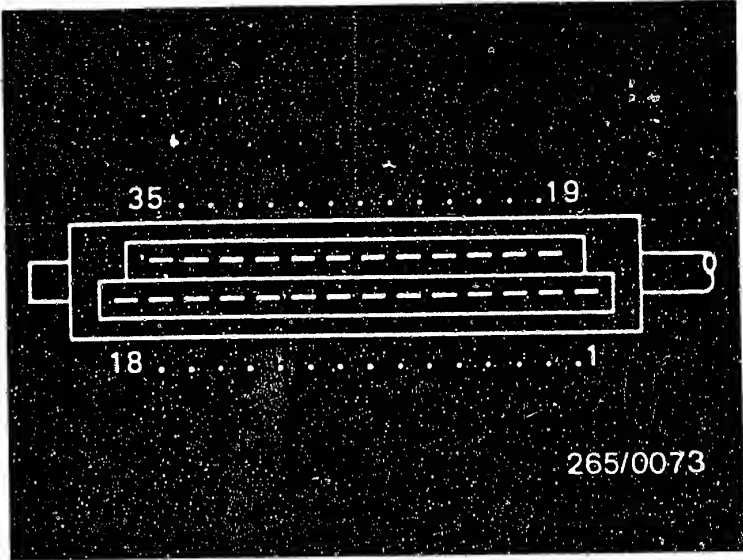
Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 10		
Operation:	Reading:	Testing:
Program switch "V" at position <div style="text-align: center;">↓</div>	On multimeter:	Component:
	Less than 10 $\Omega$	Kick-down switch
Program switch "N" at position <div style="text-align: center;">15</div>	(Reading is influenced by protective resistor in adapter)	
Measuring equipment:		Operation:
Ohmmeter		Contact for continuity (Term. 3 to Term. 22, ground)
Measuring range:		
0 to 10 k $\Omega$		
Connection:		Malfunction:
Test sockets $\Omega$		Resistance greater than 10 $\Omega$
Operation in vehicle: Switch off ignition Selector switch in position P Accelerator pressed all the way down	If reading O.K., continue testing with next test step.	

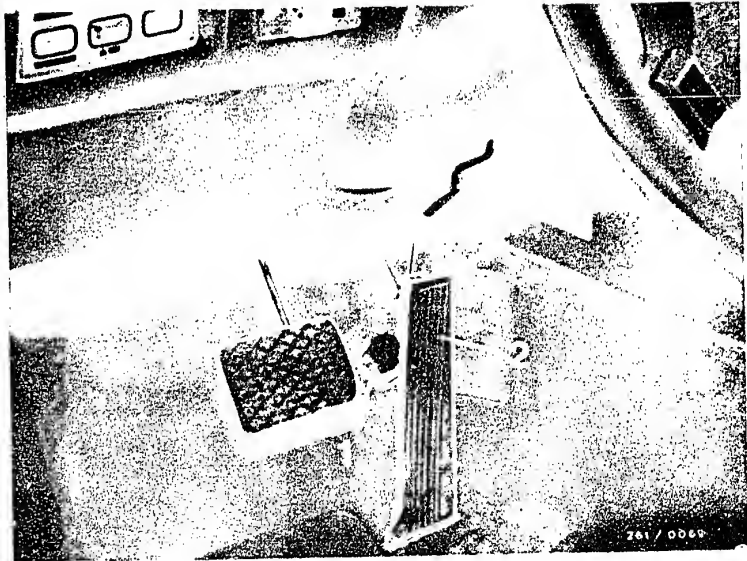
Trouble-shooting:


- Test lead to Term. 3 for continuity. Contact O.K.?
- Test kick-down switch and its ground connection.



Top view of 35-pin multiple plug of transmission wiring harness

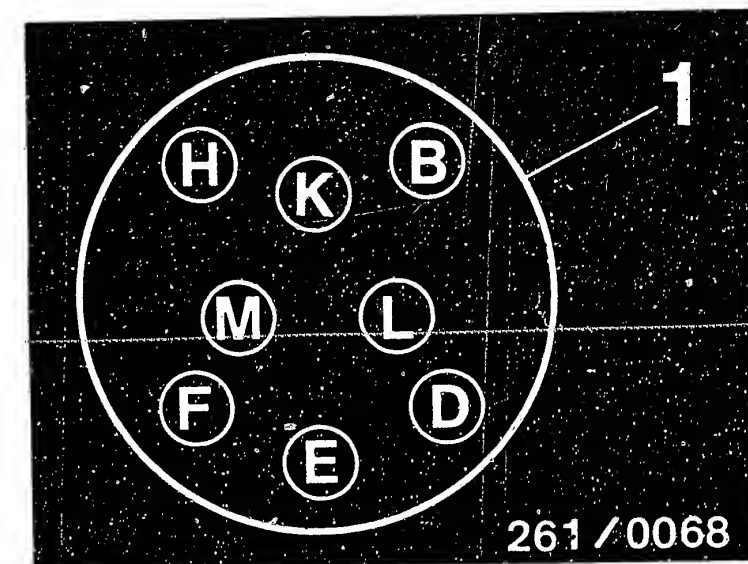
- 1 = Kick-down switch
- 2 = Accelerator



TEST STEP 11		
Operation:	Reading:	Testing:
Program switch "V" at position 	On multimeter: 25...65 $\Omega$	Component:
Program switch "Ω" at position 16		Solenoid-operated valve MV1 in transmission
Measuring equipment: Ohmmeter		Operation:
Measuring range: 0 to 10 k $\Omega$	If reading O.K., continue testing with next test step.	Winding resistance between Term. 5 and Term. 18
Connection: Test sockets $\Omega$		Malfunction:
Operation in vehicle: Switch off ignition Selector switch in position P		Resistance outside tolerance

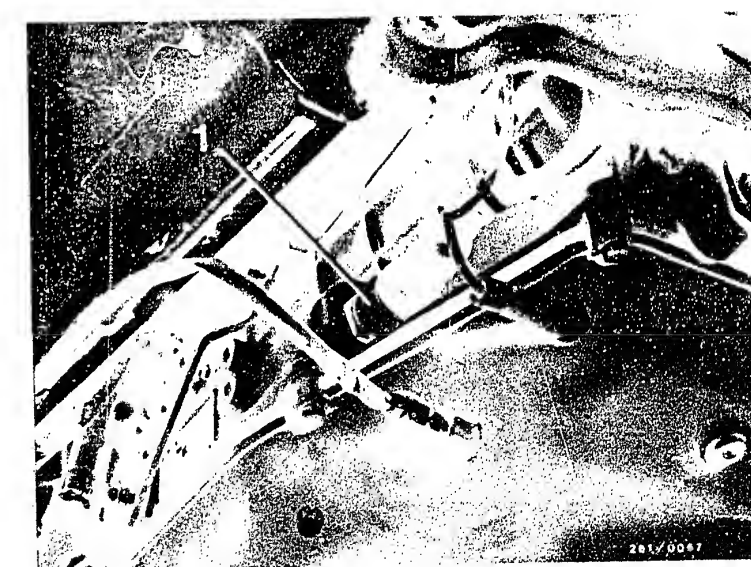
#### Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
- Measure winding resistance directly at plug section on transmission between terminals H and M for solenoid-operated valve MV1.  
Resistance outside tolerance: Replace transmission  
Resistance correct: Test leads to Term. 5 and Term. 18 for continuity.



1 = Top view of plug part on transmission

1 = Plug connector on transmission



**C13**

Test with universal test adapter  
Electronic transmission control BMW



**C14**

Test with universal test adapter  
Electronic transmission control BMW

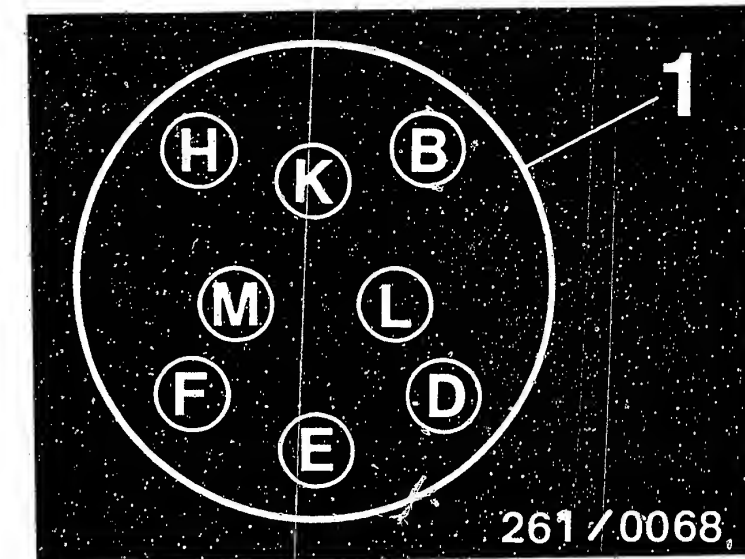




TEST STEP 12		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	↓	On multimeter: 25...65 $\Omega$	<u>Component:</u> Solenoid-operated valve MV2 in transmission
<u>Program switch "N" at position</u>	17		
<u>Measuring equipment</u> Ohmmeter			<u>Operation:</u> Winding resistance between Term. 6 and Term. 18
<u>Measuring range:</u> 0 to 10 k $\Omega$		If reading O.K., continue testing with <u>next test step</u>	<u>Malfunction:</u> Resistance outside tolerance
<u>Connection:</u> Test sockets	$\Omega$		
<u>Operation in vehicle:</u> Switch off ignition Selector switch in position P			

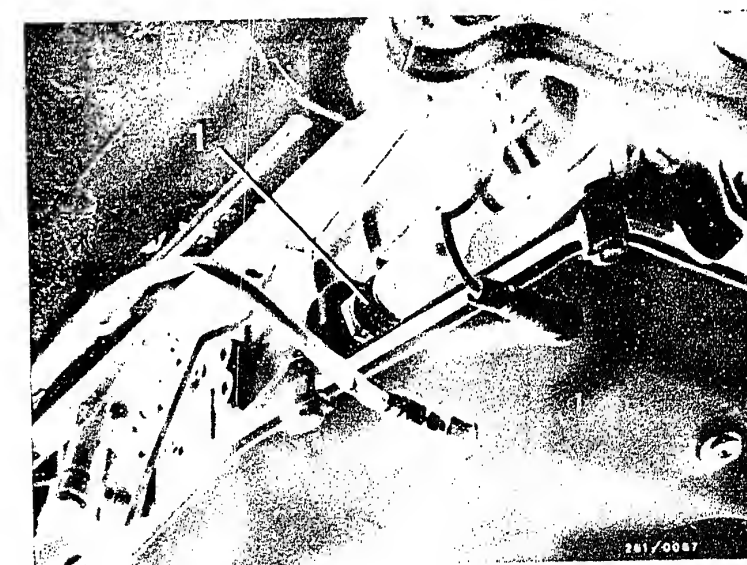
#### Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
- Measure winding resistance correctly at plug section on transmission between terminals K and M for solenoid-operated valve MV2.  
Resistance outside tolerance: Replace transmission.  
Resistance correct: Test lead to Term. 6 for continuity.



1 = Top view of plug part on transmission

1 = Plug connector on transmission



**C15**

Test with universal test adapter  
Electronic transmission control BMW

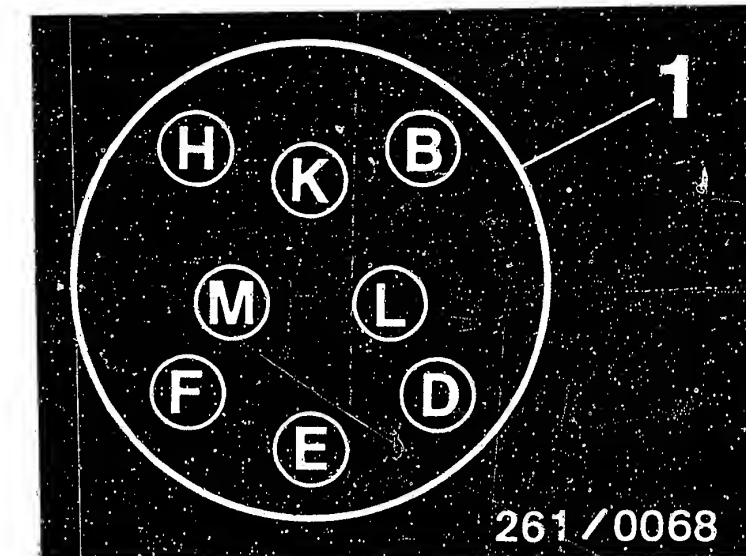


**C16**

Test with universal test adapter  
Electronic transmission control BMW

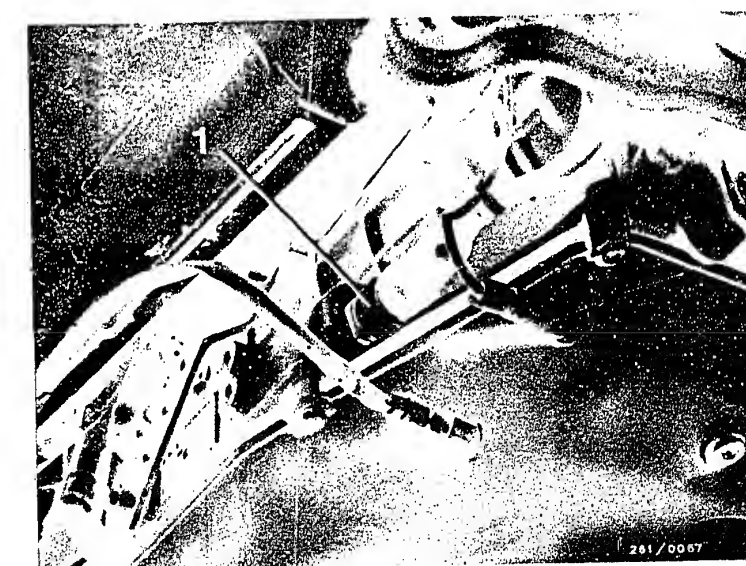


TEST STEP 13			
Operation:		Reading:	Testing:
Program switch "V" at position	↓	On multimeter: <u>25...65 <math>\Omega</math></u>	Component:  Solenoid-operated valve for reverse gear lock
Program switch "Ω" at position	18		
Measuring equipment: Ohmmeter			Operation:  Winding resistance between Term. 7 and Term. 18
Measuring range: 0 to 10 k $\Omega$		If reading O.K., continue testing with <u>next test step</u>	Malfunction:  Resistance outside tolerance
Connection: Test sockets	Ω		
Operation in vehicle: Switch off ignition Selector switch in position P			



1 = Top view of plug part on transmission

1 = Plug connector on transmission

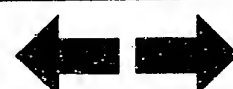


#### Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
- Measure winding resistance directly at plug section on transmission between terminals D and M for reverse gear lock solenoid-operated valve.  
Resistance outside tolerance: Replace transmission.  
Resistance correct: Test lead to Term. 7 for continuity.

**C17**

Test with universal test adapter  
Electronic transmission control BMW

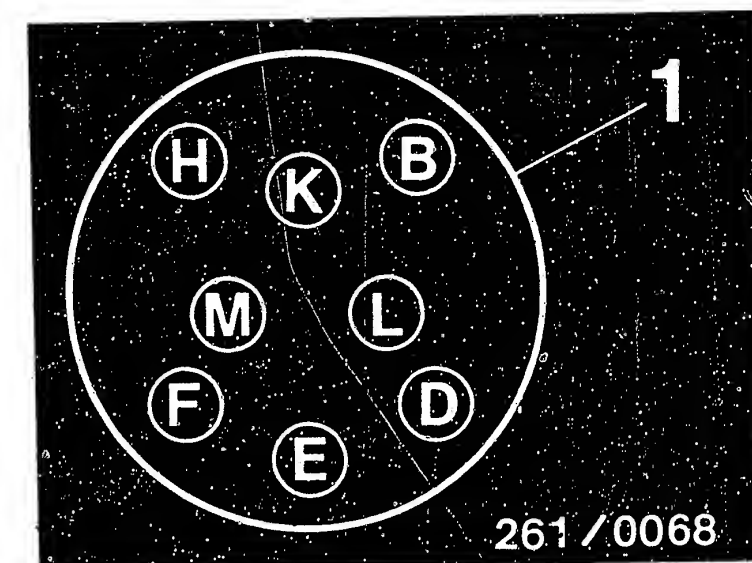


**C18**

Test with universal test adapter  
Electronic transmission control BMW

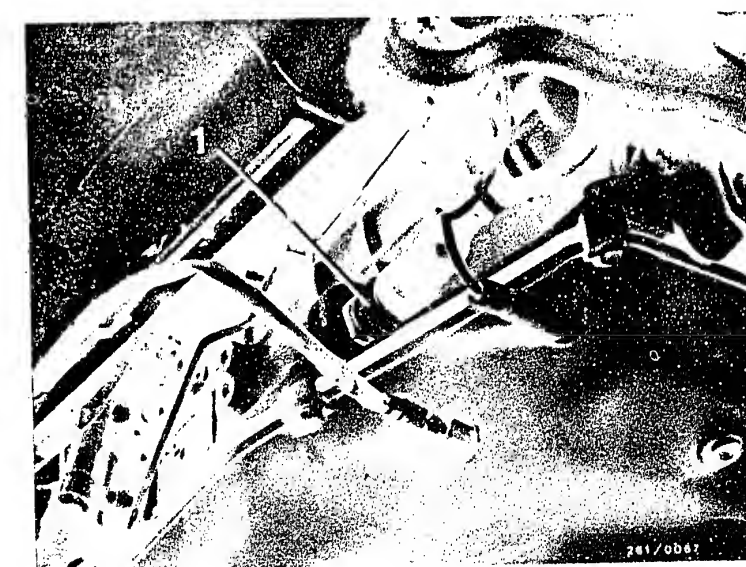


TEST STEP 14			
Operation:		Reading:	Testing:
Program switch "V" at position	↓	On multimeter: 25...65 $\Omega$	Component:  Solenoid-operated valve for converter clutch
Program switch "Ω" at position	19		
Measuring equipment: Ohmmeter			Operation:  Winding resistance between Term. 17 and Term. 18
Measuring range: 0 to 10 k $\Omega$			
Connection: Test sockets	Ω	If reading O.K., continue testing with <u>next test step</u>	Malfunction:  Resistance outside tolerance
Operation in vehicle: Switch off ignition Selector switch in position P			



1 = Top view of plug part on transmission

1 = Plug connector on transmission

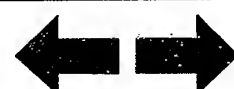


#### Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
- Measure winding resistance directly at plug section on transmission between terminals L and M for converter clutch solenoid-operated valve.  
Resistance outside tolerance: Replace transmission.  
Resistance correct: Test lead to Term. 17 for continuity.

**C19**

Test with universal test adapter  
Electronic transmission control BMW




**C20**

Test with universal test adapter  
Electronic transmission control BMW

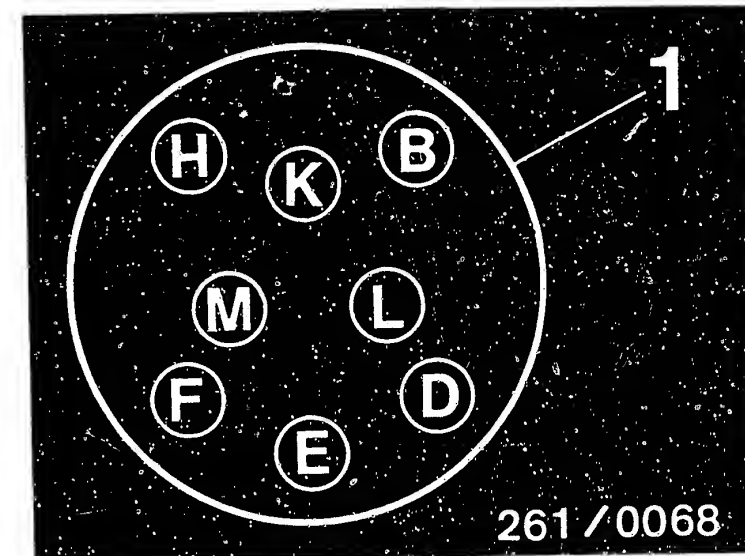




TEST STEP 15			
<u>Operation:</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Program switch "V" at position</u>		On multimeter: <u>4.5 ... 9 Ω</u>	<u>Component:</u> Pressure regulator in transmission
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Ohmmeter			<u>Operation:</u> Winding resistance between Term. 2 and Term. 18
<u>Measuring range:</u> 0 to 10 kΩ			
<u>Connection:</u> Test sockets	Ω		<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position P		If reading O.K., continue testing with <u>next test step</u> .	

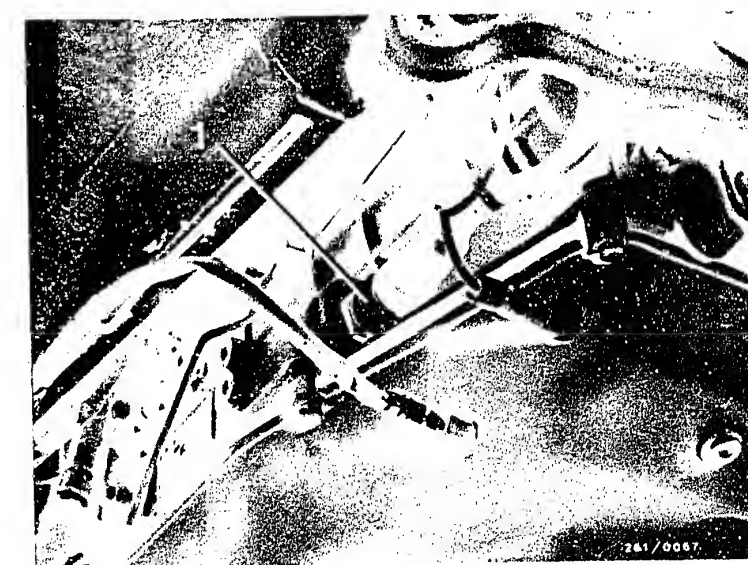
#### Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
  - Measure winding resistance directly at plug section on transmission between terminals B and M for pressure regulator.
- Resistance outside tolerance: Replace transmission.  
Resistance correct: Test lead to Term. 2 for continuity.



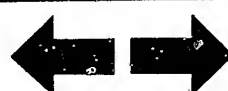
1 = Top view of plug part on transmission

1 = Plug connector on transmission



**C21**

Test with universal test adapter  
Electronic transmission control BMW

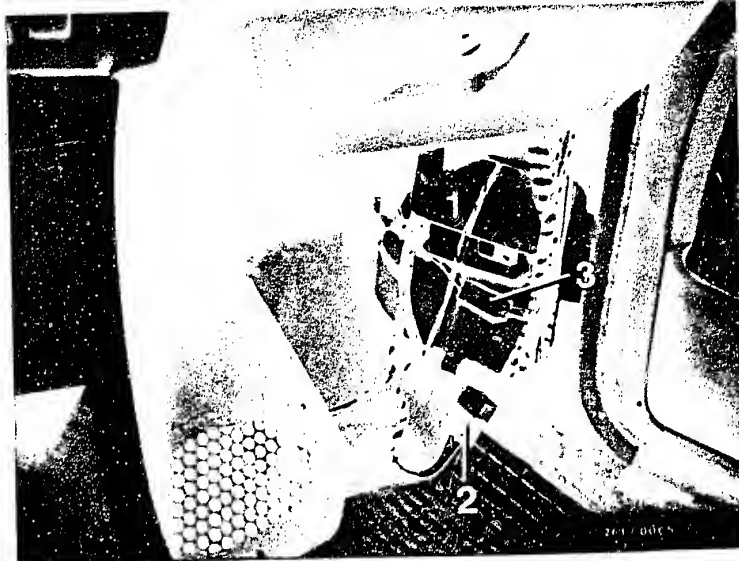


**C22**

Test with universal test adapter  
Electronic transmission control BMW

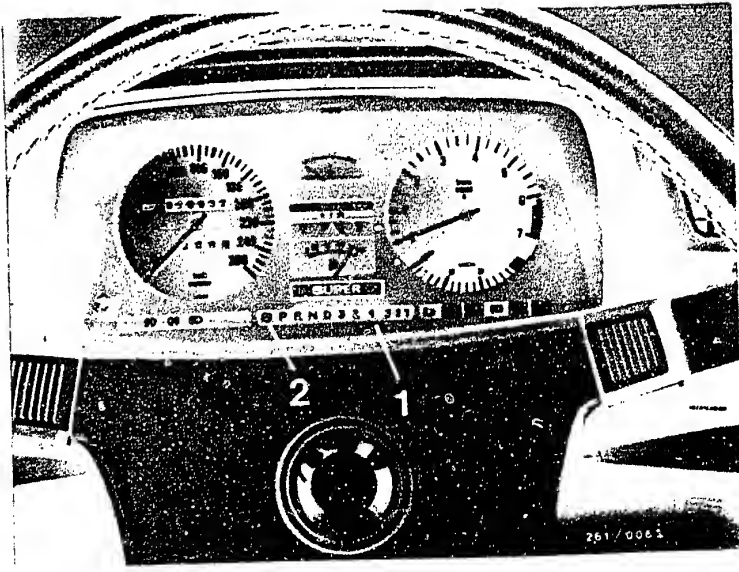


TEST STEP 16		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	3	On multimeter:  1.  <u>10...15 V</u>  2. Warning lamp for transmission control lights up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          	



1 = Control unit  
 2 = Transmission relay  
 3 = 4-pin plug connector

1 = Indicator unit  
 2 = Warning lamp for electronic transmission control



Trouble-shooting:

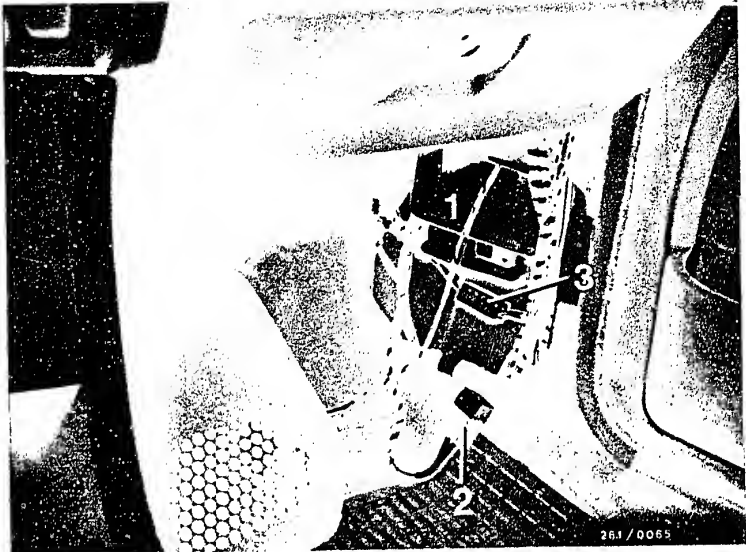
For 1.

- Test lead including plug-in connections from multiple plug Term. 10 to relay 2 Term. 87.
- Replace relay 2.

For 2.

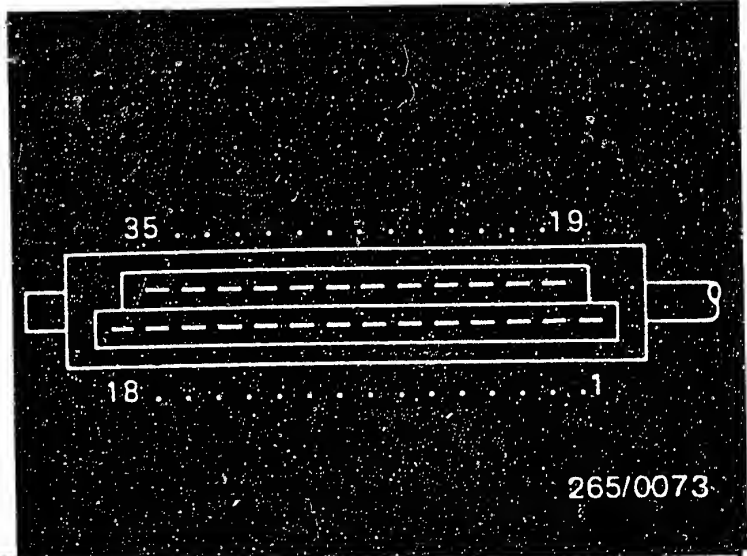
- Replace relay for transmission
- Replace bulb for warning lamp
- Test leads including plug-in connections from control unit Term. 10 to relay for transmission Term. 30, as well as from Term.87a to warning lamp.
- Test ground lead of warning lamp.

TEST STEP 17		Reading:	Testing:
Operation:			
<u>Program switch "V" at position</u>	4	On multimeter 1. <u>10...15 V</u> 2. Warning lamp for transmission control goes out          If reading O.K., continue testing with <u>next test step</u> .	<u>Component:</u>  Relay for transmission control
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u>  15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V		<u>Operation:</u>  Relay coil (Term. 19 to ground), make contact (Term. 18 to Term. 22, ground)
<u>Press button</u>	T3		<u>Malfunction:</u>  Voltage less than 10 V, Warning lamp does not go out
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position P			

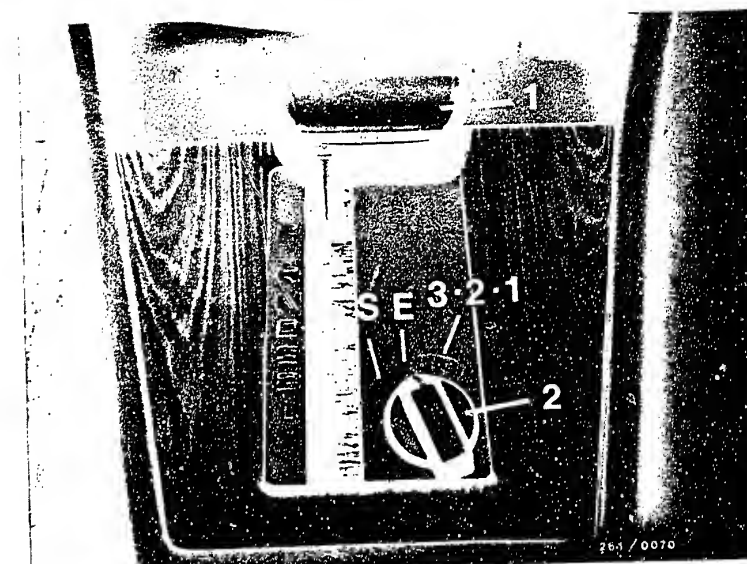


1 = Control unit  
 2 = Transmission relay  
 3 = 4-pin plug connector

Top view of 35-pin multiple plug of transmission wiring harness

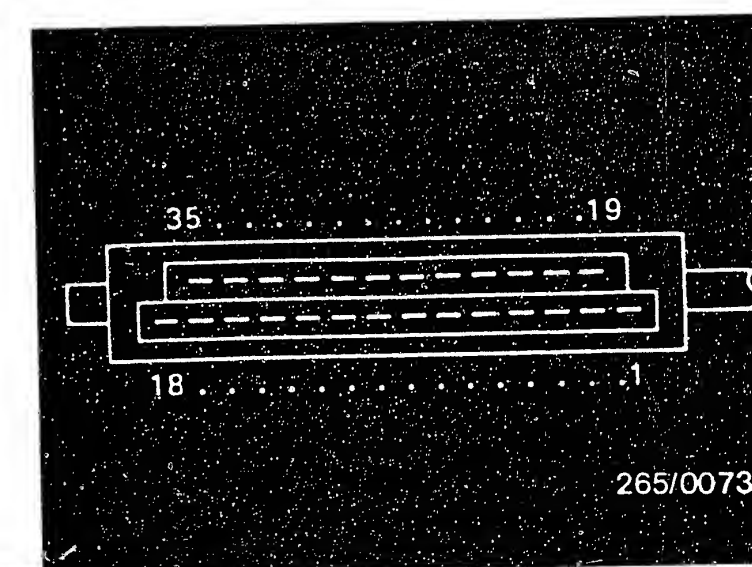


TEST STEP 18		Reading:	Testing:
Operation:			
<u>Program switch "V" at position</u>	5	On multimeter:  1.  <u>Greater than 6 V</u>  2. Gear indicator 1 lights up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            <	



1 = Selector switch  
2 = Program switch

Top view of 35-pin multiple plug of transmission wiring harness



#### Trouble-shooting:

No voltage reading and no gear indicator: Test fuse No. 17 and positive lead to selector switch Term. 3.

For 1.

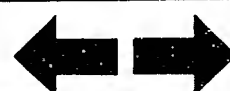
- Test lead including plug-in connection from multiple plug Term. 12 to selector switch Term. 9
- Set selector switch or selector switch defective

For 2.

- Test lead including plug-in connection from control unit Term. 12 to indicator unit Term. 11.
- Test gear indicator 1 (bulb 1, diode, power supply).

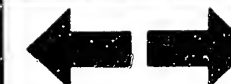
**D3**

Test with universal test adapter  
Electronic transmission control BMW

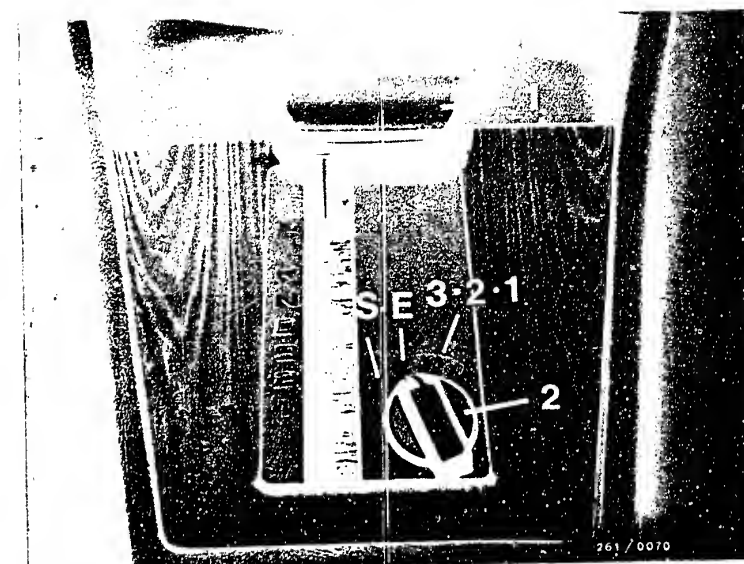


**D4**

Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 19		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	5	On multimeter:  1.  <u>Less than 1 V</u>  2. Gear indicator 2 lights up	<u>Component:</u>  1. Selector switch 2. Indicator unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u>  1. Voltage between Term. 12 and Term. 22 (ground) 2. Gear indicator
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V		<u>Malfunction:</u>  1. Voltage greater than 1 V 2. Gear indicator does not light up
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position 2		If reading O.K., continue testing with <u>next test step</u> .	



1 = Selector switch  
2 = Program switch

# Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 8 to indicator unit Term. 10.
- Test gear indicator 2 (bulb 2, diode, power supply).

**D5**

Test with universal test adapter  
Electronic transmission control BMW



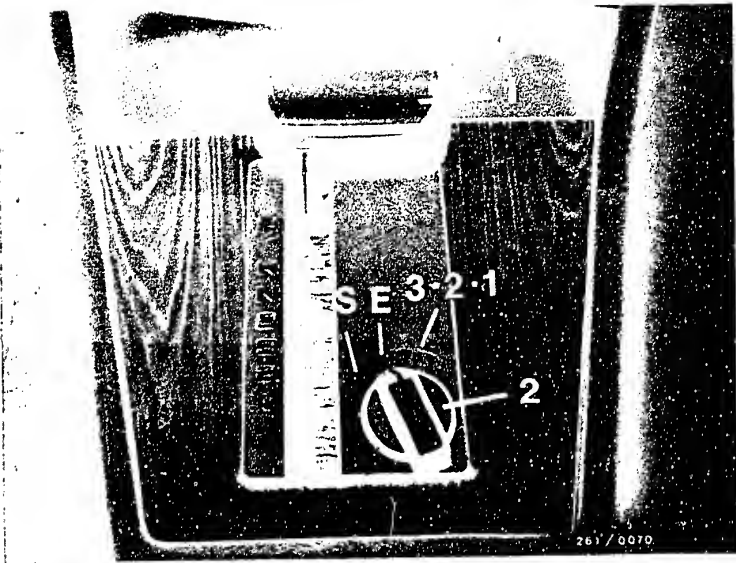
**D6**

Test with universal test adapter  
Electronic transmission control BMW



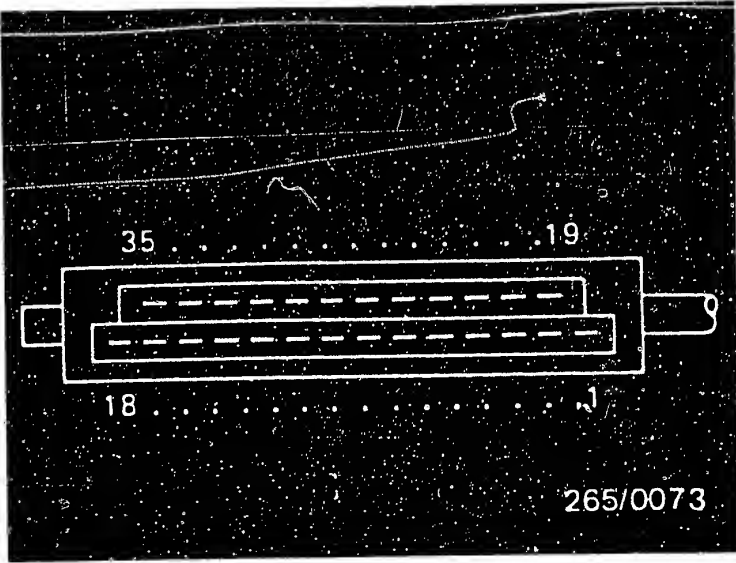


TEST STEP 20			
<u>Operation:</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Program switch "V" at position</u>	6	On multimeter:  Greater than 6 V  <u>Note:</u> Gear indicator 2 still lit.          If reading O.K., continue testing with <u>next test step.</u>	<u>Component:</u>  Selector switch
<u>Program switch "Ω" at position</u>	20		<u>Operation:</u>  Voltage between Term. 13 and Term. 22 (ground)
<u>Measuring equipment:</u>  Voltmeter			
<u>Measuring range:</u>  15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
<u>Operation in vehicle:</u>  Switch on ignition Selector switch in position 2			



1 = Selector switch  
2 = Program switch

Top view of 35-pin multiple plug of transmission wiring harness



### TEST STEP 21

#### Operation:

Program switch "V" at position

6

Program switch "Ω" at position

20

#### Measuring equipment:

Voltmeter

#### Measuring range:

15 V

Connection: Test sockets  
(red = +, black = ground)

V

#### Operation in vehicle:

Switch on ignition  
Selector switch in position 3

#### Reading:

On multimeter:

1.

Less than 1 V

2. Gear indicator  
3 lights up

If reading O.K.,  
continue testing  
with next test step.

#### Testing:

##### Component:

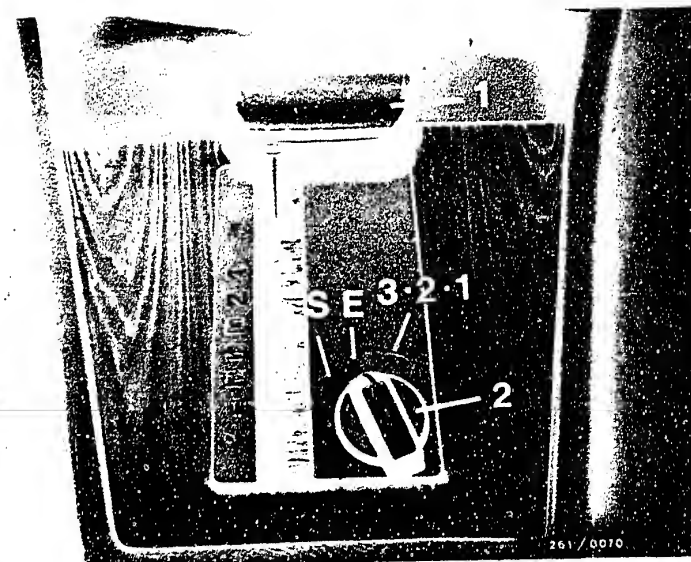
1. Selector switch
2. Indicator unit

##### Operation:

1. Voltage between Term. 13  
and Term. 22 (ground).
2. Gear indicator

##### Malfunction:

1. Voltage greater than 1 V
2. Gear indicator does not  
light up



1 = Selector switch  
2 = Program switch

#### Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch  
pin 3 to indicator unit Term. 9
- Test gear indicator 3 (bulb 3, diode, power supply).

D9

Test with universal test adapter  
Electronic transmission control BMW



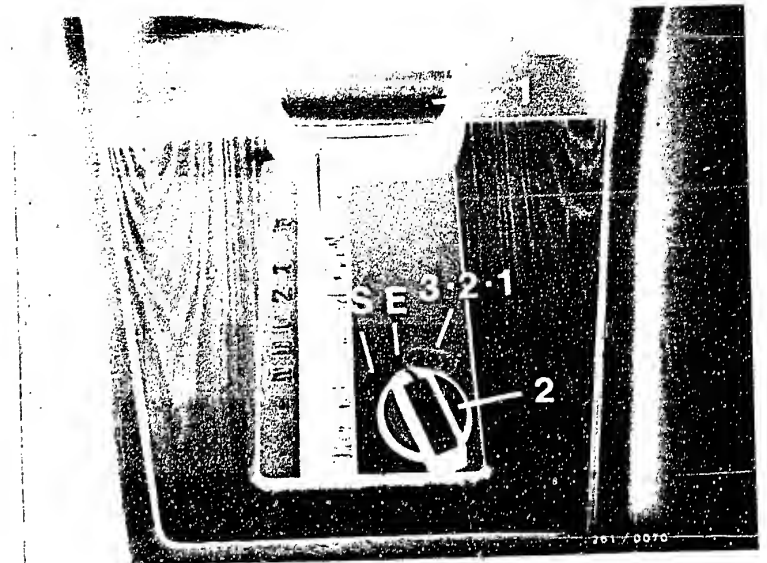
D10

Test with universal test adapter  
Electronic transmission control BMW



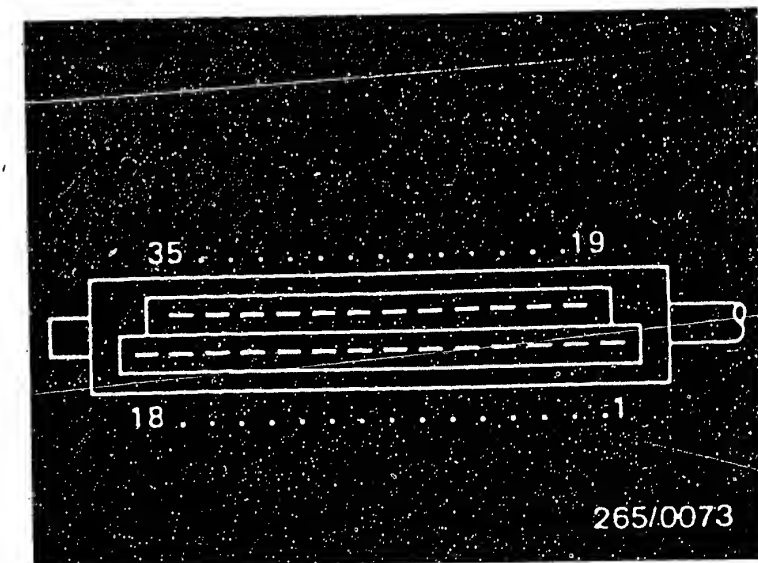


TEST STEP 22			
Operation:		Reading:	Testing:
Program switch "V" at position	7	On multimeter: Greater than 6 V  Note: Gear indicator 3 still lit.	Component: Selector switch
Program switch "Ω" at position	20		
Measuring equipment: Voltmeter			Operation: Voltage between Term. 28 and Term. 22 (ground)
Measuring range: 15 V			
Connection: Test sockets (red = +, black = ground)	V		
Operation in vehicle: Switch on ignition Selector switch in position 3		If reading O.K., continue testing with next test step.	Malfunction: Voltage less than 6 V



1 = Selector switch  
2 = Program switch

Top view of 35-pin  
multiple plug of trans-  
mission wiring harness



### TEST STEP 23

#### Operation:

Program switch "V" at position

7

Program switch "Ω" at position

20

#### Measuring equipment:

Voltmeter

#### Measuring range:

15 V

Connection: Test sockets  
(red = +, black = ground)

V

#### Operation in vehicle:

Switch on ignition  
Selector switch in position D

#### Reading:

On multimeter:

Less than 1 V

2. Gear indicator D  
lights up

If reading O.K.,  
continue testing with  
next test step.

#### Testing:

##### Component:

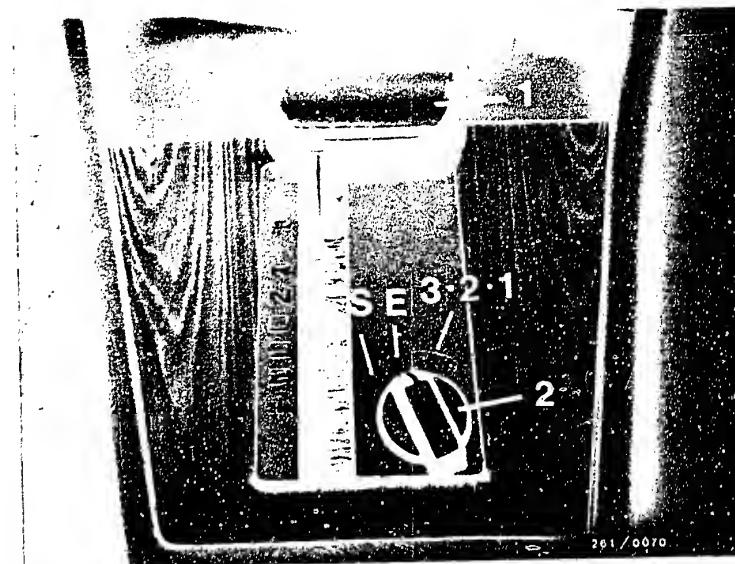
1. Selector switch
2. Indicator unit

##### Operation:

1. Voltage between Term. 28 and  
Term. 22 (ground)
2. Gear indicator

##### Malfunction:

1. Voltage greater than 1 V
2. Gear indicator does not  
light up



- 1 = Selector switch  
2 = Program switch

#### Trouble-shooting :

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch  
Term. 7 to indicator unit Term. 8.
- Test gear indicator D (bulb D, diode, power supply).

**D13**

Test with universal test adapter  
Electronic transmission control BMW

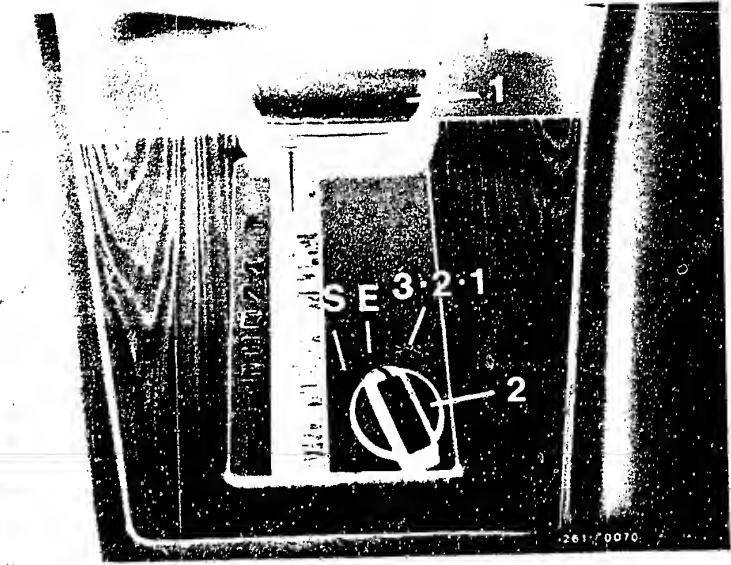


**D14**

Test with universal test adapter  
Electronic transmission control BMW

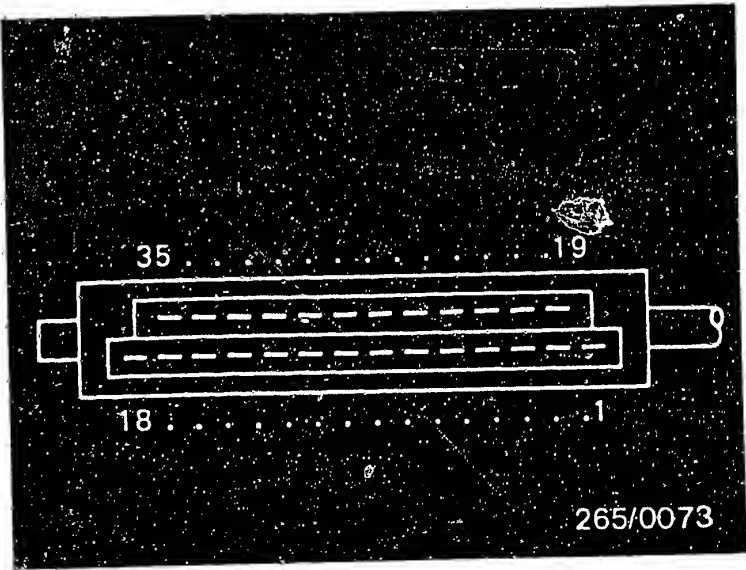


TEST STEP 24		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	8	On multimeter: <u>Greater than 6 V</u>  <u>Note:</u> Gear indicator D still lit.          If reading O.K., continue testing with <u>next test step.</u>	<u>Component:</u> Selector switch
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Voltage between Term. 29 and Term. 22 (ground).
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V		<u>Malfunction:</u> Voltage less than 6 V
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position D			



1 = Selector switch  
2 = Program switch

Top view of 35-pin multiple plug of transmission wiring harness



Trouble-shooting:

- Test lead including plug-in connection from multiple plug Term. 29 to selector switch Term. 7.

TEST STEP 25		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	8	On multimeter: 1. Less than 1 V  2. Gear indicator N lights up	<u>Component:</u>  1. Selector switch 2. Indicator unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u>  1. Voltage between Term. 29 and Term. 22 (ground) 2. Gear indicator
<u>Measuring range:</u>  15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V	If reading O.K., continue testing with <u>next test step.</u>	<u>Malfunction:</u>  1. Voltage greater than 1 V 2. Gear indicator does not light up
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position N			



1 = Selector switch  
2 = Program switch

#### Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 6 to indicator unit Term. 6.
- Test gear indicator N (bulb N, diode, power supply).

**D17**

Test with universal test adapter  
Electronic transmission control BMW



**D18**

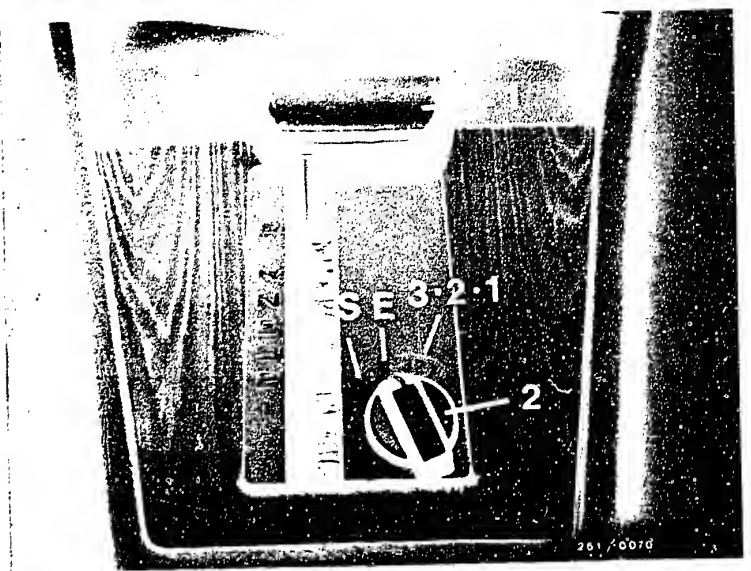
Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 26			
Operation:		Reading:	Testing:
<u>Program switch "V" at position</u>	9	On multimeter <u>Greater than 6 V</u>	<u>Component:</u> Selector switch
<u>Program switch "N" at position</u>	20	<u>Note:</u> Gear indicator N still lit	
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Voltage between Term. 30 and Term. 22 (ground)
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position N		If reading O.K., continue testing with <u>next test step.</u>	<u>Malfunction:</u> Voltage less than 6 V

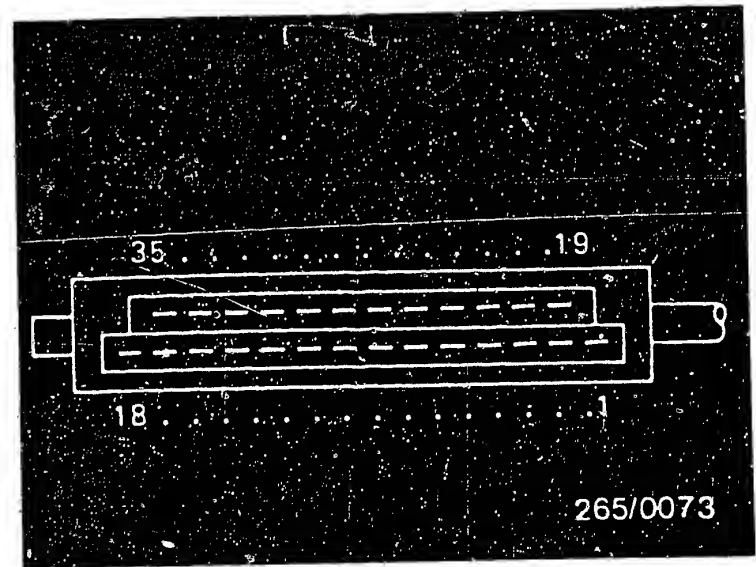
#### Trouble-shooting:

- Test lead including plug-in connection from multiple plug Term. 30 to selector switch Term. 6.



- 1 = Selector switch  
2 = Program switch

Top view of 35-pin  
multiple plug of trans-  
mission wiring harness



**D19**

Test with universal test adapter  
Electronic transmission control BMW



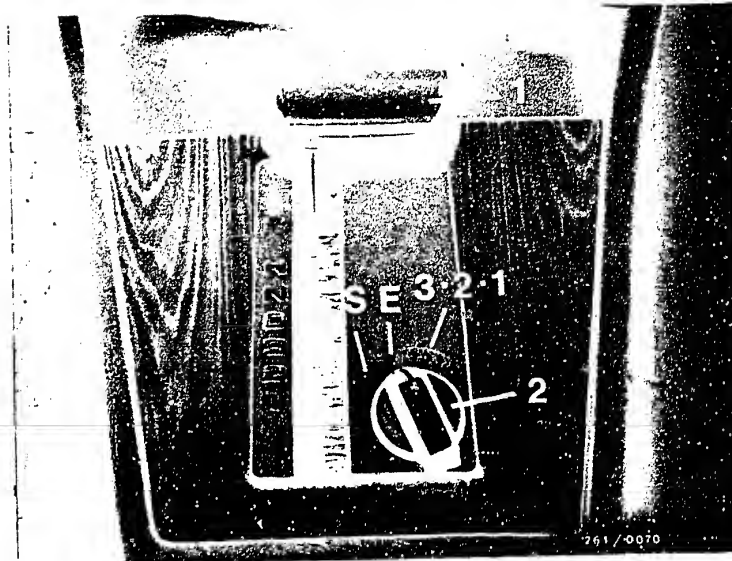
**D20**

Test with universal test adapter  
Electronic transmission control BMW





TEST STEP 27		Reading:	Testing:
Operation:			
<u>Program switch "V" in position</u>	9	On multimeter  1.  <u>Less than 1 V</u>  2. Gear indicator R lights up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         	



1 = Selector switch  
2 = Program switch

#### Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 5 to indicator unit Term. 5.
- Test gear indicator R (bulb R, Diode, power supply).

**D21**

Test with universal test adapter  
Electronic transmission control BMW

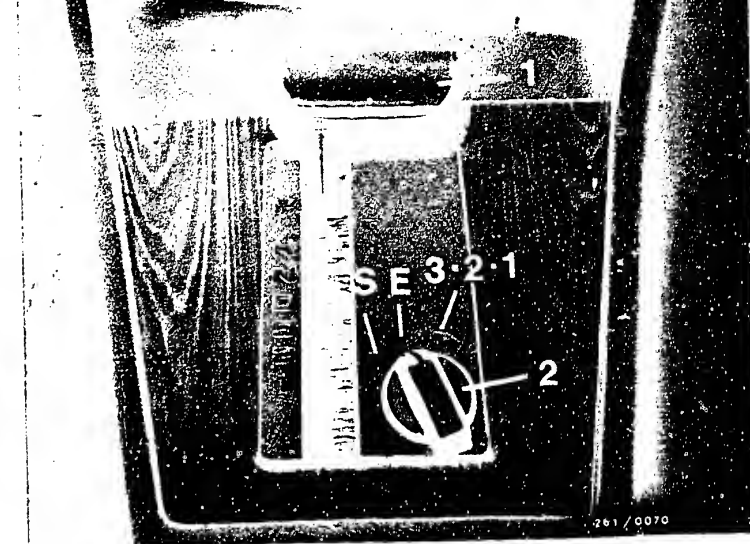


**D22**

Test with universal test adapter  
Electronic transmission control BMW



<u>TEST STEP 28</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Operation:</u>			
<u>Program switch "V" at position</u>	9	On multimeter:  1.  <u>Less than 1 V</u>  2. Gear indicator P lights up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               <	



1 = Selector switch  
 2 = Program switch

#### Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 4 to indicator unit Term. 4
- Test gear indicator P (bulb P, power supply).

**D23**

Test with universal test adapter  
 Electronic transmission control BMW



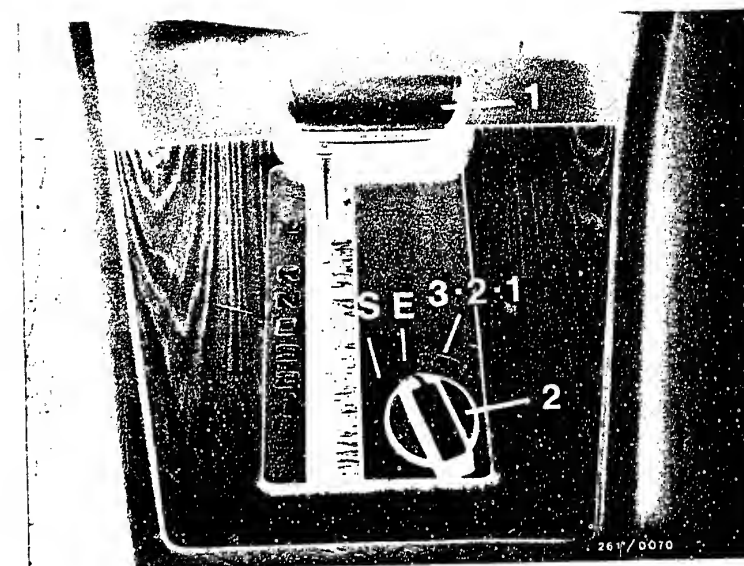
**D24**

Test with universal test adapter  
 Electronic transmission control BMW





<u>TEST STEP 29</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Operation:</u>			
<u>Program switch "V" at position</u>	10	On multimeter: <u>Greater than 4 V</u>	<u>Component:</u>  Program switch
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u>  Voltage between Term. 34 and Term. 22 (ground)
<u>Measuring range:</u>  15 V			
<u>Component: Test sockets (red = +, black = ground)</u>	V		<u>Malfunction:</u>  Voltage less than 4 V
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position P Program switch in position E		If reading O.K., continue testing with <u>next test step.</u>	

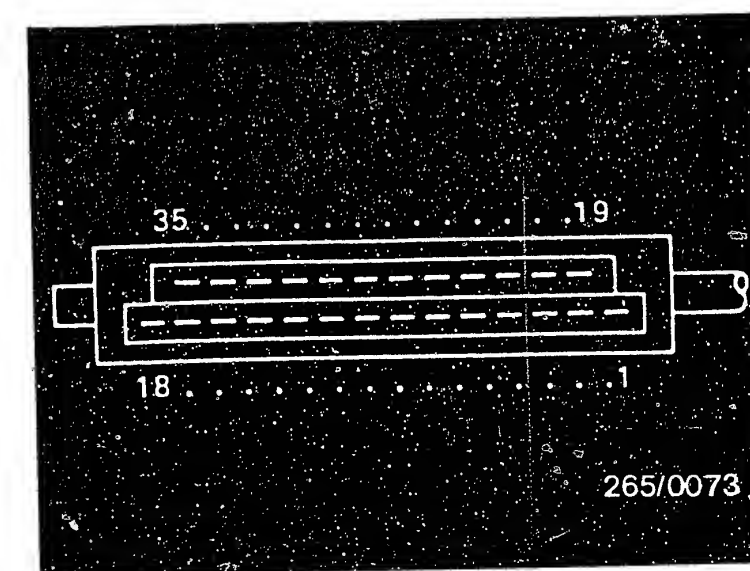


1 = Selector switch  
2 = Program switch

Top view of 35-pin  
multiple plug of trans-  
mission wiring harness

#### Trouble-shooting:

- Test lead including plug-in connection from multiple plug Term. 34 to program switch Term. 3.2.1 and to indicator unit Term. 3.
- Test positive lead to indicator unit Term. 12
- Test electronics for gear indicator 3.2.1.
- Program switch is defective



**E1**

Test with universal test adapter  
Electronic transmission control BMW

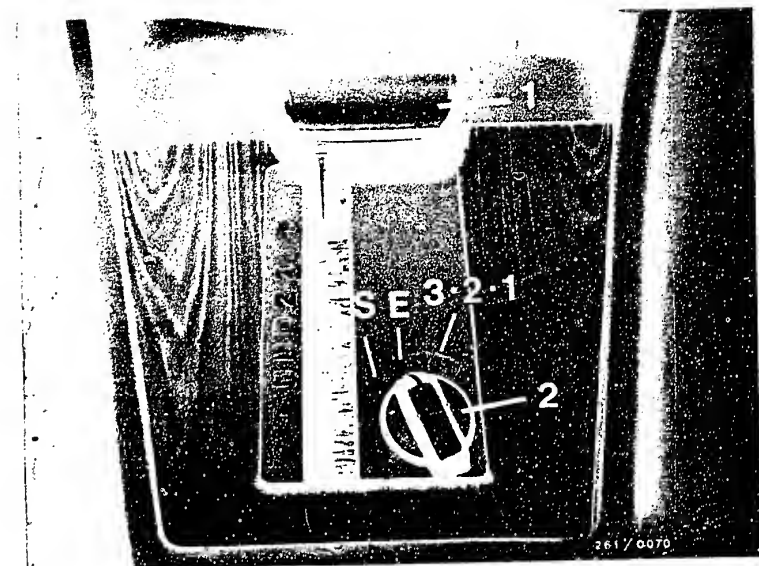


**E2**

Test with universal test adapter  
Electronic transmission control BMW

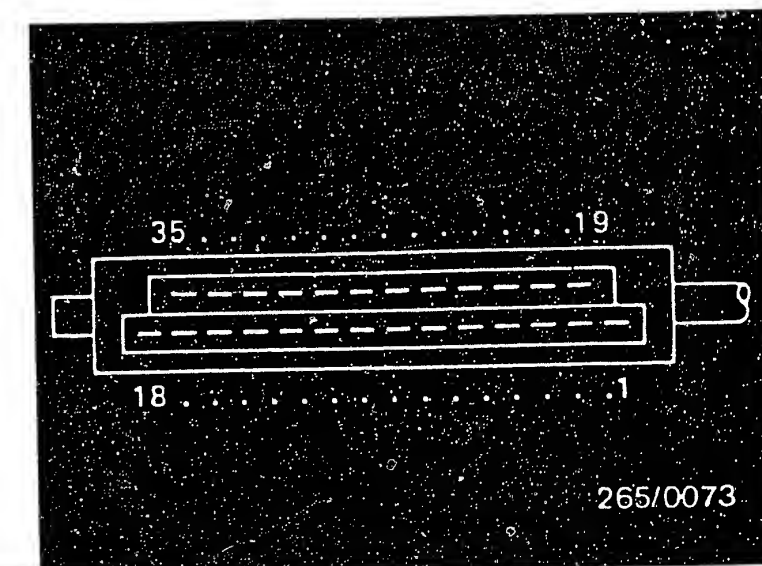


TEST STEP 30		Reading:	Testing:
Operation:			
<u>Program switch "V" at position</u>	10	On multimeter:  1.  <u>Less than 0.8 V</u>  2. Gear indicator 3.2.1 lights up.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 	



1 = Selector switch  
2 = Program switch

Top view of 35-pin  
multiple plug of trans-  
mission wiring harness



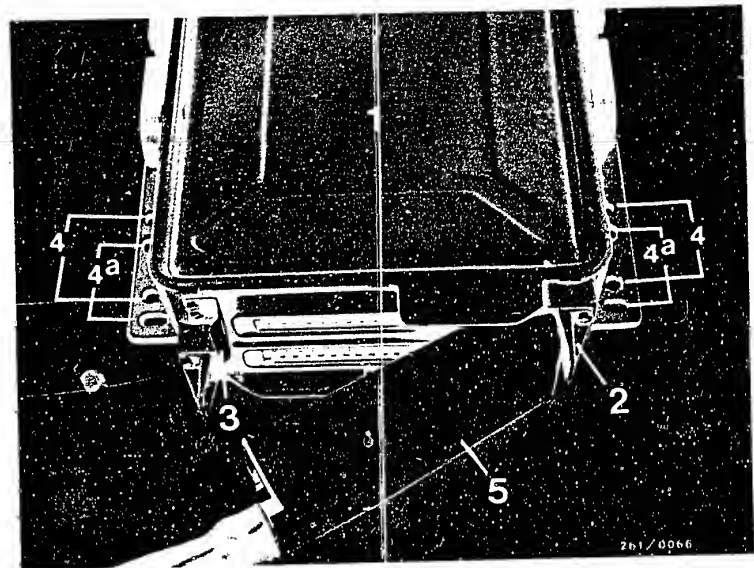
E3

Test with universal test adapter  
 Electronic transmission control BMW

E4

Test with universal test adapter  
 Electronic transmission control BMW

TEST STEP 31, Switch off ignition and connect control unit.			
Operation:		Reading:	Testing:
Program switch "V" at position	11	On multimeter: <u>10...15 V</u>	Component: Control unit
Program switch "Ω" at position	20		
Measuring equipment: Voltmeter			Operation:  Output stage for solenoid-operated valve of converter clutch. Voltage between Term. 17 and Term. 22 (ground).
Measuring range: 15 V			
Connection: Test sockets (red = +, black = ground)		V	Malfunction:  Voltage less than 10 V
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).		If reading O.K., continue testing with <u>next test step</u> .	
Operation in vehicle: Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.			



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

#### Trouble-shooting:

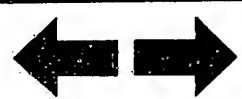
- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.

**F1**

**E5**

Test with universal test adapter  
Electronic transmission control BMW

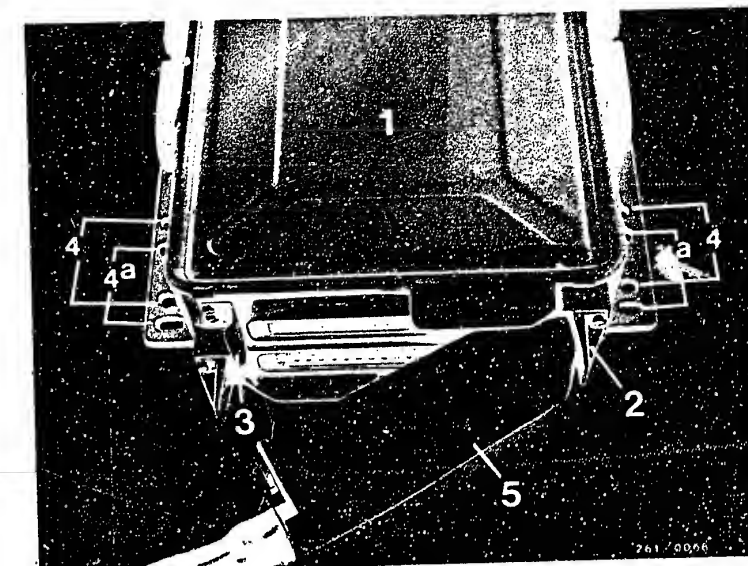


**E6**

Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 32		Reading:	Testing:
Operation:			
<u>Program switch "V" at position</u>	12	On multimeter: <u>10...15 V</u>	<u>Component:</u>  Control unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u> 15 V			<u>Operation:</u>  Output stage for solenoid-operated valve of reverse gear lock Voltage between Term. 7 and Term. 22 (ground)
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.		If reading O.K., continue testing with <u>next test step</u> .	<u>Malfunction:</u>  Voltage less than 10 V



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

#### Trouble-shooting:

- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.

**F1**

**E7**

Test with universal test adapter  
Electronic transmission control BMW

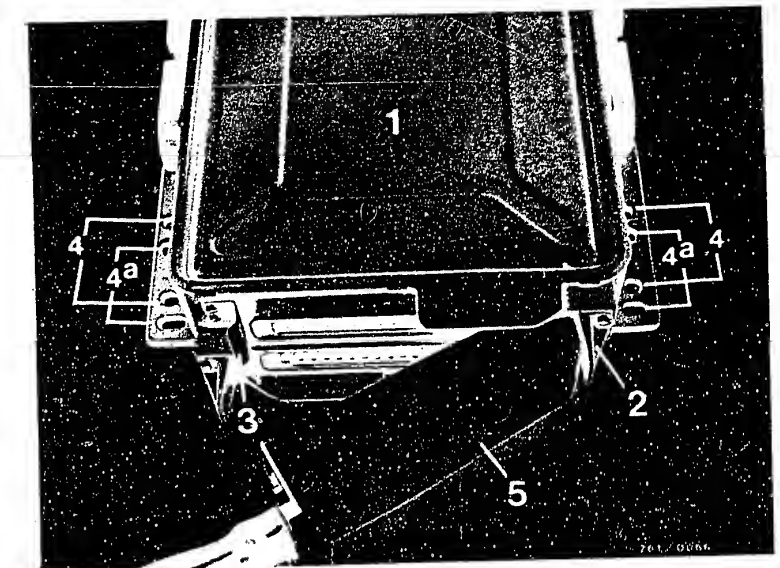


**E8**

Test with universal test adapter  
Electronic transmission control BMW



TEST STEP 33		Reading:	Testing:
Operation:			
Program switch "V" at position	13	On multimeter:  <u>Less than 1 V</u>	<u>Component:</u>
Program switch "Ω" at position	20		Control unit
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u>  Output stage for solenoid-operated valve MV1 Voltage between Term. 5 and Term. 22 (ground)
<u>Measuring range:</u> 15 V		<u>Malfunction:</u>  Voltage greater than 1 V	
Component: Test sockets (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.		If reading O.K., continue testing with <u>next test step</u> .	



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

#### Trouble-shooting:

- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.

**F1**

**E9**

Test with universal test adapter  
Electronic transmission control BMW



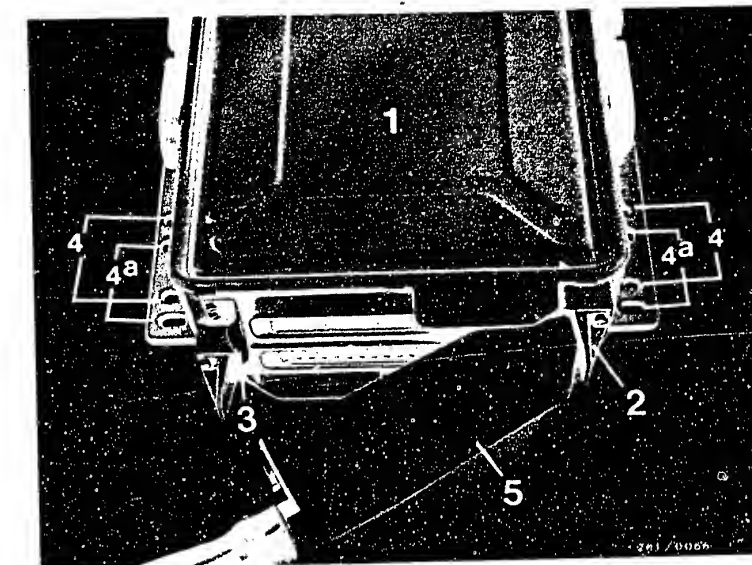
**E10**

Test with universal test adapter  
Electronic transmission control BMW





TEST STEP 34			
Operation:		Reading:	Testing:
<u>Program switch "V" at position</u>	14	On multimeter: <u>Less than 1 V</u>	<u>Component:</u>  Control unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u>  Output stage for solenoid-operated valve MV2 Voltage between Term. 6 and Term. 22 (ground)
<u>Measuring range:</u> 15 V			<u>Malfunction:</u>  Voltage greater than 1 V
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.		If reading O.K., continue testing with <u>next test step.</u>	



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

#### Trouble-shooting:

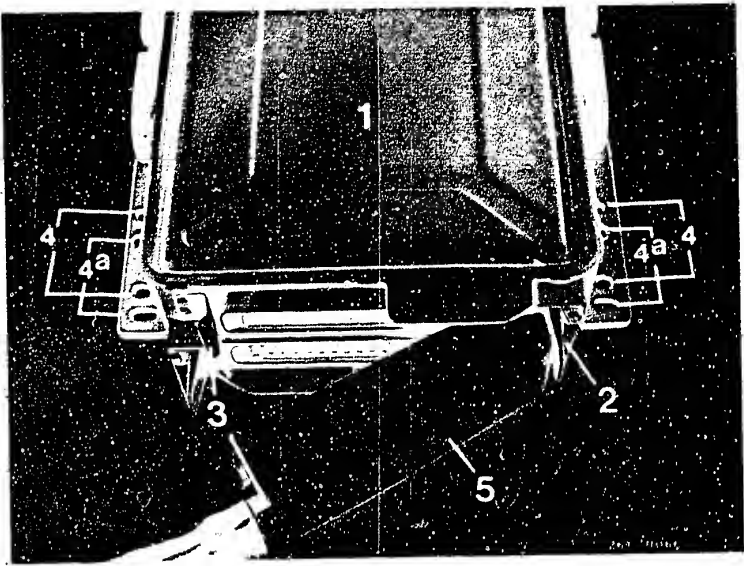
- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.

**F1**



TEST STEP 35, test steps 35 to 42 to be performed on chassis dynamometer			
Operation:		Reading:	Testing:
<u>Program switch "V" at position</u>	15	On multimeter: <u>Less than 1 V</u>	<u>Component:</u> Control unit
<u>Program switch "Ω" at position</u>	20	<u>At approx. 20 km/h</u>	
<u>Measuring equipment:</u> Voltmeter		(Read off speed on chassis dynamometer)	<u>Operation:</u> Switching of output stage for solenoid-operated valve of reverse gear lock. Voltage between Term. 7 and Term. 22 to(ground)
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 20 km/h solenoid-operated valve switches.		If reading O.K., continue testing with <u>next test step</u> .	<u>Malfunction:</u>  Voltage greater than 1V. Solenoid-operated valve does not switch at approx. 20 km/h.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a= Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Repeat test. Driving speed sufficient?
  - Replace control unit.
  - Check speed sensor signal with test step 41 and 42.
- To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

F1

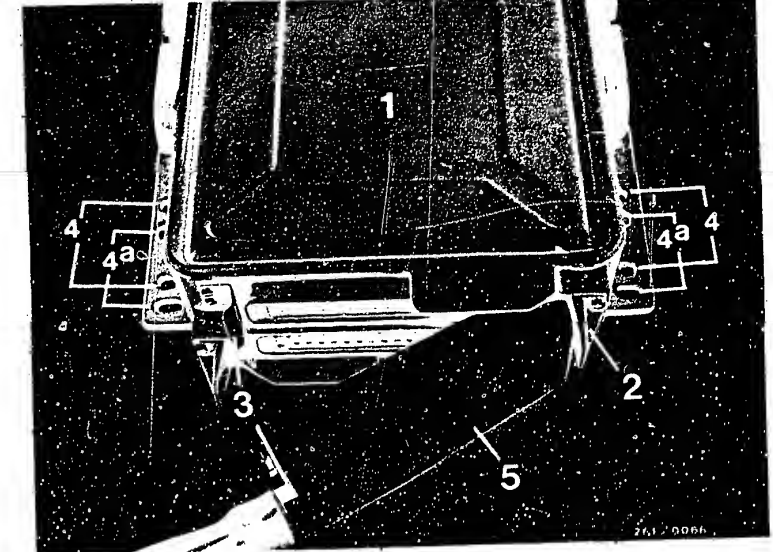
E13

Test with universal test adapter  
 Electronic transmission control BMW

E14

Test with universal test adapter  
 Electronic transmission control BMW

TEST STEP 36, vehicle on chassis dynamometer		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	16	On multimeter: <u>10 ... 15 V</u>  At approx. 40 km/h  (Read off speed on chassis dynamometer).          If reading O.K., continue testing with <u>next test step</u> .	<u>Component:</u>  Control unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u>  Switching of output stage for solenoid-operated valve MV1. Voltage between Term. 5 and Term. 22 (ground).
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A)		<u>Malfunction:</u>  Voltage less than 10 V; Solenoid-operated valve does not switch at approx 40 km/h	
<u>Operation in vehicle:</u> Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 40 km/h solenoid-operated valve switches.			



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a= Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Repeat test. Driving speed sufficient?
  - Replace control unit.
  - Check speed sensor signal with test step 41 and 42.
- To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

**F1**

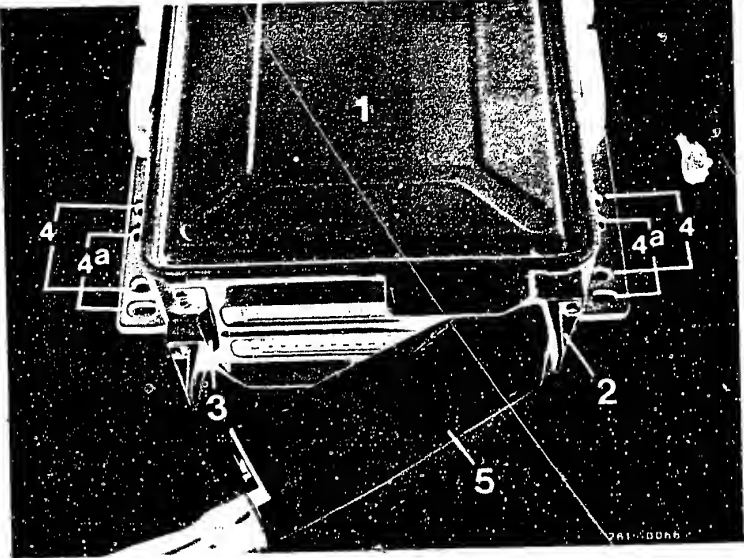
E15

Test with universal test adapter  
 Electronic transmission control BMW

E16

Test with universal test adapter  
 Electronic transmission control BMW

TEST STEP 37, Vehicle on chassis dynamometer			
<u>Operation:</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Program switch "V" at position</u>	17	On multimeter: <u>10 ... 15 V</u>	<u>Component:</u>  Control unit
<u>Program switch "Ω" at position</u>	20	<u>At approx.</u> <u>80 km/h</u>	
<u>Measuring equipment:</u> Voltmeter		(Read off speed on chassis dynamometer)	<u>Operation:</u>  Switching of output stage for solenoid- operated valve MV2 Voltage between Term. 6 and Term. 22 (ground).
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 80 km/h solenoid-operated valve switches.		If reading O.K., continue testing with <u>next test</u> <u>step</u> .	<u>Malfunction:</u>  Voltage less than 10 V. Solenoid-operated valve does not switch at approx. 80 km/h.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a= Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Repeat test. Driving speed sufficient?
  - Replace control unit.
  - Check speed sensor signal with test step 41 and 42.
- To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

**F1**

E17

Test with universal test adapter  
Electronic transmission control BMW

E18

Test with universal test adapter  
Electronic transmission control BMW

# TEST STEP 38, vehicle on chassis dynamometer

## Operation:

Program switch "V" at position 18

Program switch "Ω" at position 20

## Measuring equipment:

Voltmeter

## Measuring range:

15 V

Connection: Test sockets  
(red = +, black = ground) V

Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).

## Operation in vehicle:

Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 100 km/h the converter clutch closes with 1 second delay.

## Reading:

On multimeter:

Less than 1 V

At approx.  
100 km/h  
(Read off speed on chassis dynamometer)

## Note:

To be able to read off the shift point correctly, the speed must be increased very slowly in the range around 90 km/h since converter clutch closes with 1 sec. delay.

If reading O.K., continue testing with next test step.

## Testing:

## Component:

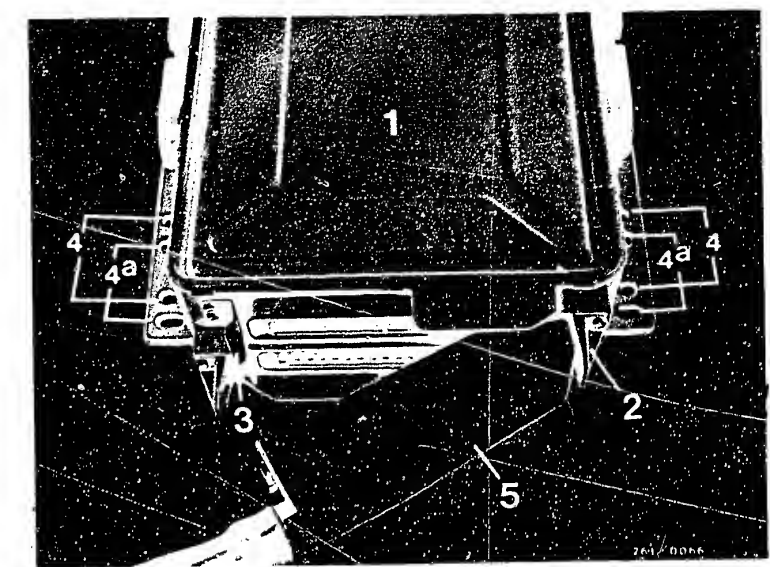
Control unit

## Operation:

Switching of output stage for solenoid-operated valve of converter clutch. Voltage between Term. 17 and Term. 22 (ground).

## Malfunction:

Voltage greater than 1 V; converter clutch not closing at approx. 100 km/h.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

## Trouble-shooting:

- Drive up to the shift point once again very slowly.
  - Replace control unit.
  - Check speed sensor signal with test step 41 and 42.
- To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

**F1**

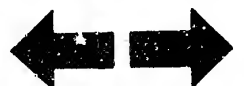
**E19**

Test with universal test adapter  
Electronic transmission control BMW

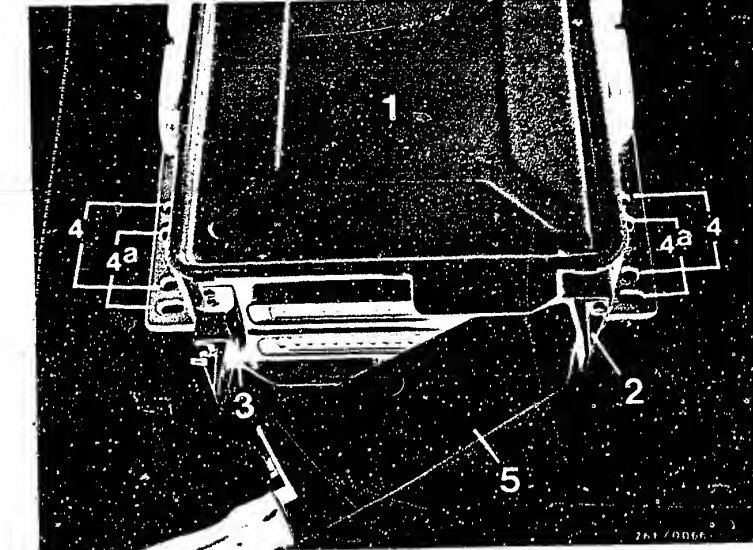


**E20**

Test with universal test adapter  
Electronic transmission control BMW







- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

TEST STEP 39, vehicle on chassis dynamometer		
Operation:	Reading:	Testing:
Program switch "V" at position 18	On multimeter: 635 CSi, 732i, 735i: 950 ... 1050 mA; 745i: 930...1030 mA at idle	Component: Control unit
Program switch "Ω" at position 20		
Measuring equipment: Ammeter (remove any lead which may have been plugged in)		Operation: Current regulation for pressure regulator Measurement in lead to terminal 2.
Measuring range: 1.5 A d.c.		Malfunction: Current reading outside tolerance
Connection: Test sockets 1 and 2 (1 = negative, 2 = positive) Caution! Do not bring test sockets into contact with vehicle ground, e.g. by lead hanging down, otherwise control unit may be destroyed.		
Operation in vehicle: Let engine idle. Program switch in position S, Selector switch in position D.	If reading O.K., continue testing with <u>next test step</u>	

#### Trouble-shooting:

- Replace control unit.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

E21

Test with universal test adapter  
Electronic transmission control BMW



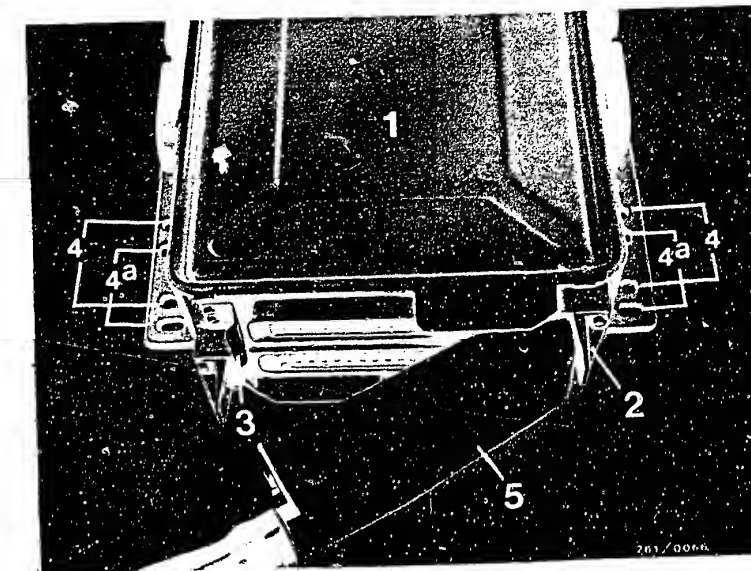
E22

Test with universal test adapter  
Electronic transmission control BMW



# TEST STEP 40: Vehicle on chassis dynamometer

Operation:		Reading:	Testing:
Program switch "V" at position	18	On multimeter: 635 CSi, 732i, 735i: 580...680 mA;  745i: 410...510 mA  with button T1 pressed  If reading O.K., continue testing with <u>next test</u> <u>step</u> .	Component: Control unit
Program switch "Q" at position	20		
Measuring equipment: Ammeter			Operation: Current regulation for pressure reg- ulator Measurement in lead to terminal 2
Measuring range: 1.5 A d.c.			Malfunction: Current reading outside tolerance
Connection: Test sockets 1 and 2 (1 = negative, 2 = positive) Caution! Do not bring test sockets into contact with vehicle ground, e.g. by lead hanging down, otherwise control unit may be destroyed.			
Press button	T1		
Operation in vehicle: Let engine idle. Program switch in position S, Selector switch in position D. Accelerate slightly until idle contact on throttle valve opens.			



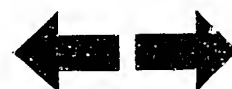
- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

## Trouble-shooting:

- Replace control unit.
- To prevent confusion between the two 35-pin plugs in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

**E23**

Test with universal test adapter  
Electronic transmission control BMW



**E24**

Test with universal test adapter  
Electronic transmission control BMW





# TEST STEP 41, vehicle on chassis dynamometer

## Operation:

## Reading:

## Testing:

Program switch "V" at position

2

Rotational-speed sensor signal (at 10 km/h) present (see bottom graph).

## Component:

Speed sensor

Program switch "Ω" at position

20

Lever to left-hand stop (calibrated voltage range).

## Operation:

Signal, Term. 8 to Term. 22

## Measuring equipment:

Motortester, oscilloscope

## Measuring range:

Special input

## Connection:

Test wells; red clip to red well, black clip to black well

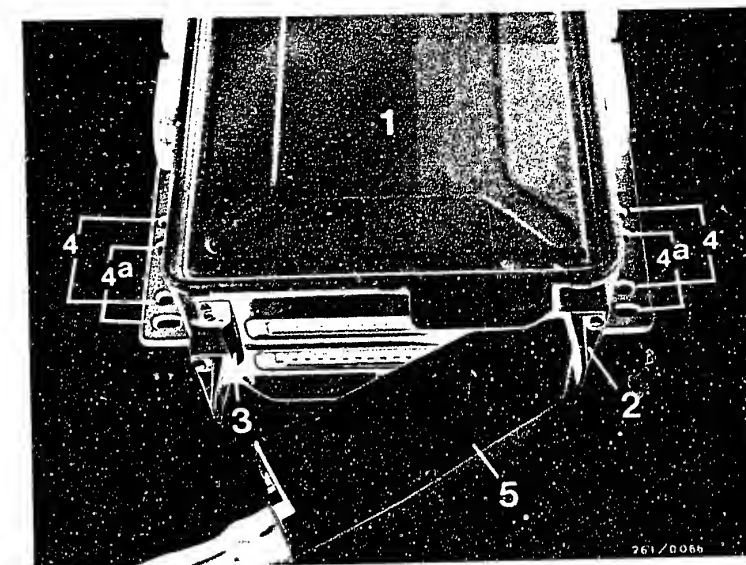
## Operation in vehicle:

Selector switch in position D, program switch in position S. Set driving speed to 10 km/h (approx. idle).

If reading O.K., continue testing with next test step.

## Malfunction:

Voltage less than 1.5 V; no signal.



1 = Control unit

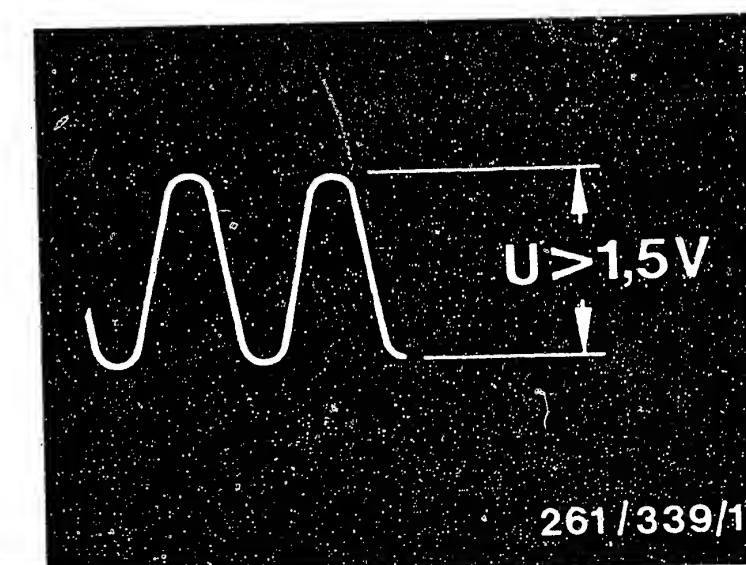
2 = Lug

3 = Detent

4 = Mounting holes for 7 series

4a = Mounting holes for 6 series

5 = Transmission plug



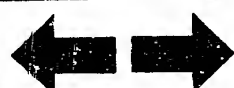
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## Trouble-shooting:

- Replace transmission.

F1

Test with universal test adapter  
Electronic transmission control BMW



F2

Test with universal test adapter  
Electronic transmission control BMW

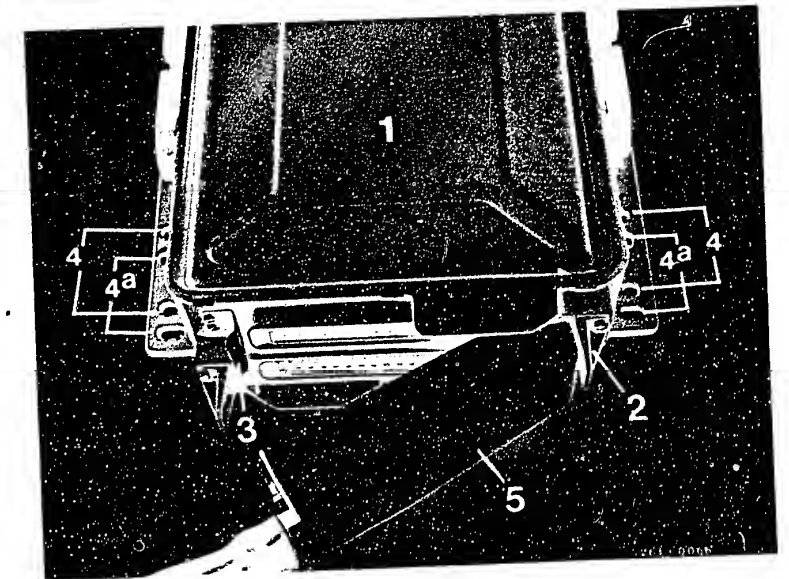


TEST STEP 42, vehicle on chassis dynamometer

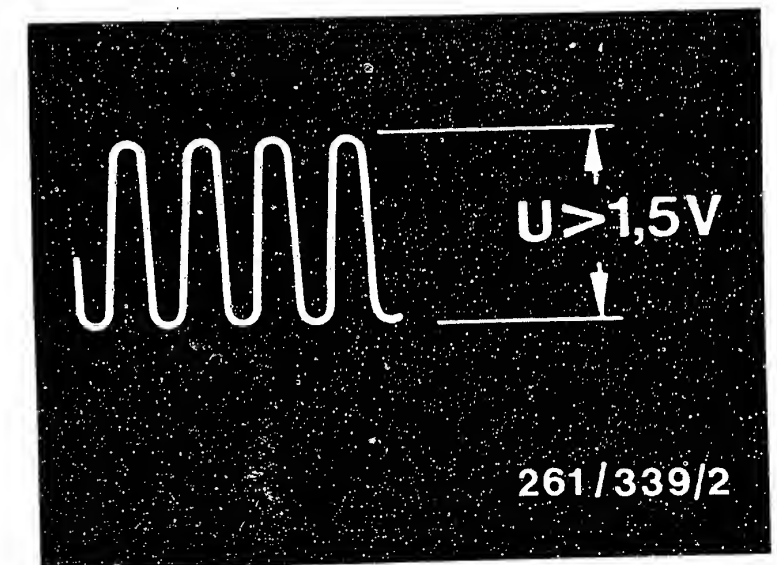
<u>Operation:</u>	<u>Reading:</u>	<u>Testing:</u>
<u>Program switch "V" at position</u> 2	Rotational-speed sensor signal (at 20 km/h) present (see bottom graph).  Lever all the way to the left (calibrated voltage range)	<u>Component:</u>  Speed sensor
<u>Program switch "Ω" at position</u> 20		
<u>Measuring equipment:</u> Motortester, oscilloscope		<u>Operation:</u>  Signal, Term. 8 to Term. 22
<u>Measuring range:</u> Special input		
<u>Connection:</u> Test wells; red clip to red well, black clip to black well		
<u>Operation in vehicle:</u> Selector switch in position D, Program switch in position S. Set driving speed to 20 km/h.		<u>Malfunction:</u>  Voltage less than 1.5 V

### Trouble-shooting:

- Replace transmission.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a= Mounting holes for 6 series
- 5 = Transmission plug



Testing with the universal test adapter is now completed. If the fault has not been found, the Motronic and the knock control must be tested, if this has not already been done.

If Motronic and knock control are O.K., trouble-shooting must be continued in the transmission mechanism, hydraulic control unit, selector switch, program switch and selector lever.

**F5**

Test with universal test adapter  
Electronic transmission control BMW



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